Appendix EE
Data Usability Assessment

Qualifier Definitions:

The following definitions apply to all analyses:

U = Undetected at the specified detection limit
UJ = Estimated nondetect
J = Estimated value
R = Rejected data point
EB = Analyte detected in the associated rinsate blank

The following definitions apply to organic analyses:

E = Estimated value; exceeds upper limit of calibration
D = Value reported is from a diluted analysis
B = Analyte detected in the associated method blank

The following definitions apply to pesticide/PCB analyses:

P = Estimated value; greater than 25% difference for the detected concentrations between the two GC columns
X = Estimated value; analyte concentration caused saturation of the detector
Y = Undetected at the specified elevated detection limit

The following definitions apply to dioxin analyses:

&, $, @, ^, % = Results reported from a diluted analysis
* = Estimated Maximum Possible Concentration (EMPC)
$ = TEQ values not calculated since the majority of results were rejected

The following definitions apply to metals and cyanide analyses:

B = Reported value is less than the contract required detection limit but greater than or equal to the instrument detection limit
E = Estimated value due to interference
* = Duplicate analysis not within control limits
N = Spiked sample recovery not within control limits

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EPA Project Officer: Diana King
EPA Remedial Project Manager: Leslie McVickar

REMEDIAL INVESTIGATION
DATA USABILITY ASSESSMENT

Pownal Tannery Superfund Site
Pownal, Vermont

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Prepared By:

Metcalf & Eddy, Inc.
30 Harvard Mill Square
Wakefield, MA 01880

Team Subcontractor
TRC Environmental Corporation
Boott Mills South
Foot of John Street
Lowell, MA 01852

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1.0 PROJECT QUALITY OBJECTIVES

Twelve matrices were sampled during the Pownal Tannery Remedial Investigation (RI). Data generated during this investigation were intended to be used for different project objectives, depending upon the matrix of interest. The different matrices included in the investigation included ground water, residential wells, lagoon sludge, surface soils, river sediment, river surface water, test pit soils, warehouse soils, floor drain sludge, outfall surface water, soil borings, and air samples. The achievement of project quality objectives was initiated with the collection of various matrices for different analytical parameters. Table 1 summarizes the number of samples collected and the associated analytical parameters for each matrix. All analyses were performed either under the Contract Laboratory Program (CLP) Routine Analytical Services (RAS) program using the Statements of Work (SOW) OLM04.2, ILM04.1 or OLC02.1 or the Metcalf & Eddy (M&E) Remedial Action Contract (RAC) Delivery of Analytical Services (DAS) program using analytical specifications developed by M&E and subsequently approved by EPA. Table 2 summarizes the SOW or DAS analytical specifications used for each parameter.

Project quality objectives were as follows:

Lagoon sludge (Phase 1), surface soils, soil borings, river sediment, river surface water, residential wells, test pit soils (lagoon and Woods Road disposal area), warehouse soils:

- To select a remedy to eliminate, reduce, or control risks the site may pose to human health and the environment;
- To obtain the minimum amount of data required to assess the human and ecological risks;
- To support the selection of an approach for site remediation;
- To determine the nature and extent of contamination in the matrix of interest; and
- To determine whether site contaminants have migrated or are migrating off site.

Ground water

- To select a remedy to eliminate, reduce, or control risks the site may pose to human health and the environment;
- To obtain the minimum amount of data required to assess the human and ecological risks;
- To support the selection of an approach for site remediation;
- To determine the nature and extent of contamination in ground water;
- To determine whether site contaminants have migrated or are migrating off site; and
- To obtain ground water analytical data that is of sufficient quality and quantity to supplement previously collected ground water data

Lagoon Sludge-Phase 2

- To select a remedy to eliminate, reduce, or control risks the site may pose to human health and the environment;
- To obtain the minimum amount of data required to assess the human and ecological risks;

- To support the selection of an approach for site remediation;
- To determine the nature and extent of contamination in lagoon sludge;
- To determine whether site contaminants have migrated or are migrating off site;
- To fill in data gaps from Phase I; and
- To determine waste characteristics of lagoon sludge.

Outfall surface water and floor drain sludge

- To determine the nature and extent of contamination in the matrix of interest; and
- To determine whether site contaminants have migrated or are migrating off site.

Air

- To select a remedy to eliminate, reduce, or control risks the site may pose to human health and the environment;
- To obtain the minimum amount of data required to assess the human and ecological risks;
- To support the selection of an approach for site remediation; and
- To evaluate ambient air in the vicinity of the site.

2.0 DATA VALIDATION

The level of validation performed on the data associated with the Pownal Tannery RI varied between each matrix and analytical parameter. Tier III validation was performed on the dioxin analyses of all matrices. For the remaining matrices, a mixture of Tier I, II or III validation was performed. The level of validation required was defined in the EPA-approved Quality Assurance Project Plan (QAPP), February, 2000; the required level of validation was met or exceeded for all matrices. Certain modifications to the QAPP-defined levels of validation were made during the investigation for various reasons. These modifications are discussed below.

Tier I validations typically include an evaluation of data completeness and performance evaluation (PE) sample results. Qualification of sample results is not performed under Tier I validations. Due to certain observations made during the field investigation, the level of effort for the Tier I validations was increased to include a review of moisture content for all lagoon sludge and sediment samples and a review of sample preservation issues for all lagoon sludge samples submitted for volatile organic compounds (VOCs). Based on the Tier I validations performed, one or more of the following circumstances triggered an increase in the level of validation to Tier II or Tier III.

- PE sample failure
- Sample preservation issues
- High moisture content (>70%)
- Presence of more than one set of results in a sample delivery group (SDG) for one sample (e.g., reextractions, reanalyses, dilutions)
- Avoidance of splitting one SDG into more than one level of validation

These circumstances are discussed in detail below.

PE Sample Failure:

In certain instances where the laboratory reported results for a PE sample which failed the acceptance criteria and this failure would have resulted in the rejection of data points if a higher level of validation had been performed, the level of validation was increased to a Tier III to possibly determine the cause of the PE sample failure (calculation error, analyte misidentification, etc.) and/or to be able to qualify the data properly if the PE sample did indeed fail.

Sample Preservation Issues:

At the beginning of the investigation, during the collection of lagoon sludge samples for VOC analysis, several samples effervesced when introduced to the sodium bisulfate preservative solution. This problem was eventually corrected in the field by the use of water only (without sodium bisulfate) to collect these samples. However, for the initial sampling efforts, these samples which effervesced were submitted to the laboratory as is. Due to a potential low bias of sample results caused by the effervescing and the unusability of nondetect results for these

samples, the validation level was increased to a Tier II in order to be able to properly qualify the sample data (estimate positive results and reject nondetects).

High Moisture Content (>70%):

As part of this program, special attention was given to potential high-moisture samples. In general, if a lagoon sludge or sediment sample was visually suspected of containing a high moisture content (>70%), the sample was sent to a DAS laboratory capable of freeze-drying the sample. The freeze-drying procedure increased the solids content of the sample and prevented the rejection of sample data, required under Region 1, due to the high moisture content. In several instances, samples believed to be low-moisture samples were sent to a RAS laboratory and subsequently found to contain high moisture (>70%). Due to the unusability of the nondetect results for samples with high moisture, the level of validation was increased to a Tier II in order to be able to properly qualify the sample data (estimate positive results and reject nondetects).

Presence of More Than One Set of Results in an SDG for One Sample:

Based on guidance that M&E received from EPA-Office of Environmental Measurement and Evaluation (OEME), all data packages were reviewed to determine if more than one result existed for a sample due to reextractions, reanalyses, or dilutions. If more than one result for a sample was found to exist, the level of validation was increased to Tier II in order to be able to determine which value should be reported and used for project quality objectives.

Avoidance of Splitting One SDG into More Than One Level of Validation:

M&E has requested that, if possible, the level of validation performed on one SDG not be split between different validation levels. Therefore, no matter what level of validation was performed, that same level was performed on all samples in the SDG and the level of validation was not split between samples in the SDG. In several instances, where the level of validation was scheduled for 50% Tier I and 50% Tier II, for example, on a particular matrix, the results for all samples of that matrix were validated as Tier II because all samples were submitted in one SDG.

The results of the data validation were used to determine if project quality objectives were met. The results of the data validation provided an evaluation of the data quality objectives (DQOs): precision, accuracy, completeness, representativeness, sensitivity, and comparability. For each analytical parameter, DQOs were established prior to the onset of the program for both field and analytical accuracy, precision, sensitivity and completeness. In order for the successful achievement of the project quality objectives described in Section 1.0, all DQOs must be met. Actual sample and quality control (QC) sample results were compared to project DQOs to determine whether quality objectives were met for this sampling event. The assessment of these DQOs and the usability of the data as a result of this assessment is discussed in the following sections.

3.0 DQO EVALUATION

3.1 Field Accuracy

Accuracy in the field was assessed through the collection and analysis of trip blanks for VOCs and equipment rinsate blanks for the majority of the remaining parameters.

The results of the equipment rinsate blanks did not indicate any systematic pattern of contamination indicative of improperly cleaned equipment or poor sampling techniques. Based on the results of the trip blanks, it does not appear that contaminant migration during shipment and storage was a problem for samples collected during this investigation. The details of these evaluations are provided below.

3.1.1 Rinsate Blanks

Rinsate blanks were used to evaluate the potential contamination of samples from the sampling equipment, cleanliness of sample containers, sample handling and collection procedures. Rinsate blanks were collected by pouring deionized water through (or over) sample collection equipment after the initial decontamination procedure and prior to use. Rinsate blanks were scheduled to be collected at a frequency of one per 20 samples per matrix per parameter, with several exceptions. This frequency requirement was met for all ground water, soil borings, surface soils, test pit soils, warehouse soils, lagoon sludge, river sediment, and river surface water samples. Equipment rinsate blanks were not required for the outfall surface water, residential well, or floor drain sludge samples due to the lack of equipment used in the sample collection procedure (i.e., sample bottles filled directly from source without the need for sampling equipment.) Due to the nature of the analyses, equipment blanks do not provide useful information in the evaluation of TOC/TCO and AVS/SEM data and were therefore not collected for these parameters.

It should be noted that the rinsate blanks associated with the ground water sampling event in August 2000 exhibited significant levels of select target analytes, suggesting possible gasoline contamination. Upon further investigation and discussion with field team members, it was determined that the water used to create the rinsate blanks during this event was stored near a gasoline supply and appeared to have become contaminated. None of the samples collected during this round of ground water sampling exhibited similar contamination. Therefore, the rinsate blank contamination was considered to be an isolated incident and the rinsate blank results were not used to evaluate the associated sample results.

Table 3 summarizes the VOC, SVOC, and pesticide contaminants which were detected in rinsate blanks throughout the RI and were also occasionally detected in field samples. Rinsate blank results were evaluated to determine if high levels of contaminants or uncommon contaminants were detected and the percentage of samples affected. All contaminants listed in Table 3 were detected at low levels in the rinsate blanks.

Of all contaminants detected, methylene chloride, acetone, 2-butanone, bis(2-ethylhexyl)phthalate, diethylphthalate are considered common contaminants. It should also be noted that for this program, benzaldehyde was found to be a common contaminant, almost

always detected in rinsate blanks associated with different matrices. For contaminants which were not considered to be common contaminants, the percentage of samples affected by the contamination was not considered significant and is also provided in Table 3.

Various metals were also detected at low levels in rinsate blanks throughout the program; this is not an uncommon occurrence as the laboratories were reporting results down to the instrument detection limits which are typically very low values. One to three dioxin/furan congeners were detected at low levels in rinsate blanks associated with lagoon sludge, surface soils, ground water, and residential well samples. Ferrous iron and/or sulfide were detected in rinsate blanks associated with the hexavalent chromium analysis of lagoon sludge and warehouse soil samples; the presence of these analytes in the rinsate blank did not adversely affect the usability of the hexavalent chromium results since these parameters were used to learn more about the nature of the solid medium and not for risk assessment purposes. Polychlorinated biphenyl (PCB) Aroclors, PCB homologs and hexavalent chromium were not detected in any rinsate blanks associated with this program.

Contamination in blanks indicates that false positives may exist in samples associated with the affected blanks; these false positives may lead to a high bias for these analytes. Select sample results were negated on the basis of this comparison, in accordance with the Tier II or III data validation guidelines. Of all the contaminants detected, select metals in soils and ground water, methylene chloride in ground water, and acetone in sediments were identified as contaminants of concern (COCs) from the human health and ecological risk assessment. The only potentially adverse effect on the usability of the data may be the potential for the reported results for methylene chloride in select ground water samples and/or acetone in select sediment samples to be biased high. Although the potential for the other contaminants to be biased high in the associated matrices exists, the listed contaminants were not identified as COCs during the human health or ecological risk assessment and therefore the overall usability of these data was not adversely impacted by the rinsate blank results.

Overall Effects of Rinsate Blank Evaluation on Usability of Data: *Methylene chloride results in samples MW-101U, MW-110U, MW-L-10, MW-L-7 and MW-L-9 slightly exceed the human health preliminary remediation goal (PRG) and this may be due to the potential high bias caused by the rinsate blank contamination. Acetone results in several sediment samples exceed the ecological PRG and this may be due to the potential high bias caused by the rinsate blank contamination.*

3.1.2 Trip Blanks

Trip blanks were used to evaluate the potential for VOC contamination of samples due to contaminant migration during sample shipment and storage. These blanks remained with the samples during shipping and storage. Trip blanks were scheduled to be submitted to the laboratory for analysis at a frequency of one per cooler when VOC samples were shipped. This frequency requirement was met for all matrices, with the exception of one shipment associated with three lagoon sludge samples (which represents only 2.7% of the total number of lagoon sludge samples submitted for analysis). Since the contaminants detected in trip blanks associated with lagoon sludge samples were relatively consistent among the remaining trip blanks, this

minor deviation did not adversely affect the sample results. Two other issues regarding trip blanks occurred during the investigation and are discussed below.

One trip blank associated with eight surface water samples exhibited significant levels of select target analytes, suggesting possible gasoline contamination. Upon further investigation and discussion with field team members, it was determined that the water used to create the trip blank during this sampling event was stored near a gasoline supply and appeared to have become contaminated. None of the associated surface water samples exhibited similar contamination. Therefore, the trip blank contamination was considered to be an isolated incident and the trip blank results were not used to evaluate the associated sample results.

All solid samples submitted to the laboratory for VOC analysis were submitted for potential low-level and high-level analysis. At the onset of the investigation, high-level trip blanks were not submitted to the laboratory as separate samples. Since the laboratory is blind to the identification of trip blank samples, these trip blanks were treated as normal samples by the laboratory (i.e., the high-level sample was only analyzed when the low-level sample exceeded the calibration range). The laboratory therefore did not analyze these high-level trip blanks since the results of corresponding low-level trip blanks did not exceed the calibration range. This was corrected for future sampling events. However, as a result of this issue, high-level trip blanks associated with 13 lagoon sludge samples (12% of the total number of lagoon sludge samples submitted for analysis) were not analyzed although the corresponding lagoon sludge samples were analyzed at high-level. The lack of trip blanks for these samples results in conservative data, potentially biased high. However, the contaminants detected in these samples were not typically detected in other high-level trip blanks analyzed during this investigation and are therefore most likely inherent to the samples and not attributable to trip blank contamination. The effect of this nonconformance on the usability of the sample data is minimal.

Table 4 summarizes the VOC contaminants which were detected in trip blanks throughout the RI and were also occasionally detected in field samples. Trip blank results were evaluated to determine if high levels of contaminants or uncommon contaminants were detected and the percentage of samples affected. All contaminants provided in Table 4 were detected at low levels in the trip blanks.

Of all contaminants detected, methylene chloride, acetone, and 2-butanone are considered common contaminants. For contaminants which were not considered to be common contaminants, the percentage of samples affected by the contamination was not considered significant and is also provided in Table 4.

Contamination in blanks indicates that false positives may exist in samples associated with the affected blanks; these false positives may lead to a high bias for these analytes. Select sample results were negated on the basis of this comparison, in accordance with the Tier II or III data validation guidelines. Of all the contaminants detected, only methylene chloride in ground water and acetone in sediments were identified as COCs from the human health and ecological risk assessment. The only potentially adverse effect on the usability of the data may be the potential for the reported results for methylene chloride in select ground water samples and/or acetone in select sediment samples to be biased high. Although the potential for the other contaminants to

be biased high in the associated matrices exists, the listed contaminants were not identified as COCs during the human health or ecological risk assessment and therefore the overall usability of the data was not adversely impacted by the trip blank results.

Overall Effects of Trip Blank Evaluation on Usability of Data: *Methylene chloride results in samples MW-101U, MW-110U, MW-L-10, MW-L-7 and MW-L-9 slightly exceed the human health PRG and this may been due to potential high bias caused by the trip blank contamination. Acetone results in several sediment samples exceed the ecological PRG and this may be due to the potential high bias caused by the trip blank contamination.*

3.1.3 Field Blanks

Field blanks were used to evaluate the potential contamination of samples from ambient conditions. Field blanks were collected by exposing the sampling media to ambient air and allowing the media to remain exposed during the entire sampling period without pumping air through. Field blanks were scheduled to be collected at a frequency of one per 20 samples per parameter for the air matrix. This frequency requirement was met.

It should be noted that the field blanks associated with the air sampling event exhibited significant levels of several SVOC and metal target analytes. Many of these target analytes were also present in the laboratory method blank and appear to be inherent to the sampling media. All of the analytes detected were below project action levels and therefore did not adversely affect the quality of the data.

3.2 Analytical Accuracy

Accuracy in the laboratory was assessed through the use of proper procedures, evaluation of cooler temperatures, sample preservation and holding times, laboratory blanks, surrogate spike recoveries, matrix spike/matrix spike duplicate (MS/MSD) recoveries and PE sample results.

3.2.1 Analytical Procedures

With the exception of the hexavalent chromium analysis of solid samples, there were no significant procedural flaws noted with the analyses performed for the RI. Based on discussions with the laboratory regarding the hexavalent chromium analyses of solid samples, it was noted that based on a procedural flaw in the DAS specification, all solid sample digestions were performed at a neutral pH. The intention of the specification was for the digestions to be performed at five alkaline pHs (8, 9, 10, 11, and 12). Hexavalent chromium cannot be efficiently measured unless the digestate is alkaline. Since all digestions were performed at neutral pHs, and hexavalent chromium was not detected in any solid samples at the site, the potential for false negatives exists. It should be noted, however, that pH and oxidation-reduction potential (ORP) analyses were performed in conjunction with the hexavalent chromium analyses. In all cases, the pH and ORP results indicated that the samples were reducing in nature and not capable of supporting hexavalent chromium. This suggests that even if the method had been performed correctly, hexavalent chromium would not have been detected. In summary, a definitive statement about the presence or absence of hexavalent chromium in solid samples at this site

cannot be made based on the data collected during the RI. Further sampling and analysis may be required due to the potential uncertainty of current results.

Overall Effects of Analytical Procedures on Usability of Data: *The results for hexavalent chromium in all solid samples (lagoon sludge, floor drain sludge, warehouse soils, surface soils, and river sediment) were not usable for project objectives due to problems with the analytical procedure.*

3.2.2 Cooler Temperatures, Sample Preservation and Holding Times

Cooler temperatures upon receipt at the laboratory were evaluated for all samples. All ground water, surface soil, warehouse soil, outfall surface water, lagoon sludge, river sediment, river surface water, floor drain sludge, and air samples were received by the laboratories with cooler temperatures within the method-specified range of 4°C ± 2°C. One soil boring sample submitted for TOC/TCO analyses, eight test pit soil samples submitted for SVOC, pesticide, and PCB analyses, and six residential well samples submitted for metals, cyanide, and hexavalent chromium analyses were received at temperatures which ranged from 7.4 to 8°C; this represents only 1.5% of all samples submitted to the laboratories for the entire RI. These temperatures were just slightly outside the method-specified range; the usability of the data associated with these samples was not adversely affected by this slight deviation.

In general, sample preservation was not a problem for the samples collected during the RI. Several lagoon sludge samples (3.6%) collected at the beginning of the investigation for VOC analysis effervesced when added to the sodium bisulfate preservative solution. To compensate for this effervescence problem, the preservative solution was subsequently changed to contain water only (and no sodium bisulfate). There were several samples collected at the beginning of the investigation which were affected by this effervescing and were not recollected in the different preservative solution. These samples include SBL4-14 (0-0.5), SBL4-14 (2-4), SBL4-21 (6-8), and SBL4-09 (0-0.5). The positive results and select nondetect results in these samples may be biased low; the remaining nondetects in these samples were not usable for project objectives due to the potential VOC losses that occurred during effervescing. Overall, VOCs were not determined to be a major concern in lagoon sludge during the development of human health PRGs. Therefore, the overall effect of this problem on the achievement of project objectives was not significant since these samples represented such a small percentage of the total number of lagoon sludge samples collected during the RI.

Due to a laboratory training error, the pH of several surface water, residential well, and all August 2000 ground water samples submitted for cyanide analysis was verified to be greater than 9 upon receipt at the laboratory and not greater than 12, as required by the method. Based on other rounds of ground water and residential well sampling of the same wells and the pH check of all samples in the field, both of which verified the samples were at the correct pH, this training issue was not believed to adversely affect the overall usability of the data.

Table 5 summarizes samples which were extracted and/or analyzed outside of holding time and the overall effect on the usability of the data. Table 5 also presents the percentage of samples for each matrix which were extracted and/or analyzed within holding time. In most cases, this

percentage is greater than 90% indicating that holding time exceedances were not a major issue for samples collected during the RI. In the two instances where the percentage was below 90, the reason was due to the number of samples which exceeded holding time for TOC/TCO analyses. In the case of river sediment, the TOC results may be biased low due to the holding time exceedance; however, the TOC results were used in conjunction with the results of the organic analyses in the development of risk assessment levels. The use of low-biased TOC results actually resulted in more conservative risk assessment numbers. If the TOC analyses of sediment samples were not used in the calculation of samples which met holding times, 99.5% of the river sediment sample analyses would be assessed as meeting holding times; this percentage would account for the analyses used to generate results which were used to calculate risk assessment levels. In the case of the soil boring samples, the TOC results were used to evaluate the soil types and other features of the soil; a potentially low-biased result did not significantly affect the usability of the TOC result. If the TOC analyses were not used in the calculation of samples which met holding times, 92.3% of the soil boring samples would be assessed as meeting holding times; this would account for the analyses used to generate results which were used to calculate risk assessment levels.

The pH analyses of six lagoon sludge samples, seven warehouse soil samples, four surface soil samples, and one surface water sample were performed outside of the holding time. The sulfide analyses of two ground water samples from the March 2000 and one surface water sample were performed outside of the holding time. Since the pH and sulfide analyses are performed in conjunction with the hexavalent chromium analysis to further determine the nature of the sample (i.e., reducing or oxidizing), the holding time nonconformance did not adversely affect the usability of the data for the intended objectives stated in Section 1.0.

Overall Effects of Cooler Temperature, Sample Preservation, and Holding Time Evaluations on Usability of Data: *The results for SVOCs and silver in samples SBL5-08 (2-4), SBL5-10 (10-12) and SBL1-01 (3-5), the results for mercury and silver in sample SBL1-15 (8-10), the results for SVOCs in samples TP-500, TP-506, TP-508, SD-009 and SD-010, and the results for dioxins/furans in samples MW-B-7, RW-001, and RW-002 may be biased low due to minor holding time exceedances. With the exception of sample TP-508, these samples exhibited results for the associated analytes which were either well below the PRGs or which already exceeded the PRG. The low bias therefore did not adversely affect the overall decision made with these data points. Sample TP-508, however, exhibited a result for a target analyte (benzo[a]pyrene) which fell just slightly below the human health PRG; the result for this analyte in sample TP-508 should be used with caution since a low bias was observed.*

3.2.3 Laboratory Blanks

Laboratory blanks were used to evaluate the potential contamination of samples from the preparation and analytical procedures within the laboratory. Laboratory blanks were prepared and/or analyzed along with each batch of field samples. Laboratory blanks were scheduled to be prepared and analyzed at a frequency of one per 20 samples per matrix per parameter per day of digestion/extraction and/or analysis. Laboratory blanks were evaluated against their associated field samples to determine if a laboratory condition contributed to false positives or high bias in the field samples.

The laboratory blank results did not indicate any significant laboratory contamination problems. Table 6 summarizes the VOC, SVOC, and pesticide contaminants which were detected in laboratory blanks analyzed with field samples from the RI which were also occasionally detected in field samples. Laboratory blank results were evaluated to determine if high levels of contaminants or uncommon contaminants were detected and the percentage of samples affected. All contaminants listed in Table 6 were detected at low levels in the laboratory blanks.

Of all contaminants detected, methylene chloride, acetone, 2-butanone, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, di-n-butylphthalate, and diethylphthalate are considered common contaminants. It should also be noted that for this program, benzaldehyde was found to be a common contaminant, due to the occurrence of this analyte in several method and rinsate blanks (as discussed above in Section 3.1.1) associated with different matrices. For contaminants which were not considered to be common contaminants, the percentage of samples affected by the contamination was not considered significant and is also provided in Table 6.

In addition to the contaminants listed in Table 6, various metals were also detected at low levels in laboratory blanks throughout the program; this is not an uncommon occurrence as the laboratories were reporting results down to the instrument detection limits which are typically very low values. Low levels of dioxin and furan congeners were detected in various laboratory method blanks. Low to high levels of several analytes were detected in the laboratory blanks associated with the SVOC and metals analyses of air samples; these contaminants were believed to be inherent to the sampling media. All levels detected in blanks associated with air samples were below project action limits and therefore did not adversely affect the quality of the data. PCB Aroclors, PCB homologs and hexavalent chromium were not detected in any laboratory blanks associated with this program.

Aluminum was detected as negative contamination in the laboratory blank associated with the surface soil samples, vanadium was detected as negative contamination in the laboratory blank associated with the September 2000 ground water sampling, and selenium and copper were detected as negative contamination in the laboratory blank associated with 15 surface water samples. The aluminum results in all surface soil samples, vanadium results in all September 2000 ground water samples and the selenium and copper results in select surface water samples may be biased low. None of these metals were identified as COCs during the human health or ecological risk assessment and therefore the overall usability of the data was not significantly impacted by the negative contamination.

Contamination in blanks indicates that false positives may exist in samples associated with the affected blanks; these false positives may lead to a high bias for these analytes. Select sample results were negated on the basis of this comparison, in accordance with the Tier II or III data validation guidelines. Although the potential for these contaminants to be biased high in the associated matrices exists, the majority of listed contaminants were not identified as COCs during the human health or ecological risk assessment and therefore the overall usability of these data was not adversely impacted by the laboratory blank results. Acetone was identified as a COC during the ecological risk assessment and the results for acetone in the sediment samples may be biased high.

Overall Effect of Laboratory Blanks on Usability of Data: *With the exception of the results for select metals and acetone, none of the contaminants detected in the laboratory blanks were identified as COCs during the human health or ecological risk assessment. Acetone and metals results in several sediment samples exceed the ecological PRG and this may be due to the potential high bias caused by the laboratory blank contamination.*

3.2.4 Surrogate Spike Recoveries

Surrogate spike compounds were added to each sample undergoing organic analyses to assess method performance and/or extraction efficiency. Different surrogate compounds were added to air sampling media both prior to collection and prior to extraction for the SVOC analyses. For the dioxin/furan analysis, surrogates are synonymous with internal standards which were also spiked in the sample prior to extraction.

Figures 1 through 11 present a summary of the surrogate spike performance in the solid and aqueous matrices for each associated organic parameter. As seen on these figures, the majority of samples yielded acceptable recoveries of the surrogate spikes. In addition, acceptable surrogate recoveries were observed in the ambient air analyses. The acceptable surrogate recoveries indicate that the organic methods utilized in the RI at the Pownal Tannery site were suitable for the matrices investigated.

There were several samples which yielded surrogate recoveries outside of the established QC acceptance criteria. The effect on the sample data was dependent on whether low or high surrogate recoveries were observed (i.e., low bias for low recoveries and high bias for high recoveries). Of the total number of samples submitted for organic analyses during the RI, only 4.6% (or 61 samples) exhibited surrogate nonconformances. Of these 61 samples, 37 samples resulted in a high bias, indicating that the resulting data were more conservative; all results were still usable for project objectives. The remaining 24 samples resulted in a low bias and the overall effect on the sample data is detailed in Table 7. In addition, several lagoon sludge (40%), sediment (20%), both floor drain sludge samples, and one surface soil sample yielded poor recoveries of internal standards in the dioxin/furan analysis; in each instance, only the dioxin/furan congener associated with the internal standard which was outside criteria was considered to be an estimated value. In the majority of these samples, only OCDD was affected. OCDD is not a major contributor to the TEQ calculation and the overall usability of the data was therefore not significantly affected by this nonconformance. It should be noted that none of the data collected during this RI were deemed unusable on the basis of surrogate recoveries.

Overall Effect of Surrogate Spikes on Usability of Data: *Results were not significantly affected by the potential low or high biases caused by surrogate nonconformances. This was due to one or more factors: (1) the availability of other data points for the same matrix as in the case of lagoon sludge and test pit soils, (2) good correlation of results with other rounds of sampling as in the cases of ground water and residential wells, (3) affected analytes were not identified as COCs during the human health or ecological risk assessments as in the cases of surface water, sediment, and warehouse soils, or (4) results were not used for risk assessment as in the case of the outfall surface water.*

3.2.5 MS/MSD Recoveries

MS compounds were added to select samples prior to preparation and/or analysis to assess the overall effect of the sample matrix on the performance of the method. MSs were scheduled to be performed at a frequency of one per 20 samples per matrix per parameter with the exception of the air matrix. MSDs were scheduled to be performed at a frequency of one per 20 samples per matrix per organic parameter with the exception of the air matrix. MS/MSD analyses were performed at the project-specified frequency. Table 8 summarizes samples submitted for MS/MSD analyses with each sampling event. It should be noted that MS/MSD analyses were not performed on most analyses associated with the floor drain sludge, outfall surface water and soil boring samples. These samples were not scheduled to be collected as part of this RI and were simply used to characterize the matrix of interest and not for risk assessment purposes. MS/MSD analyses were not performed with the pesticide/PCB analyses of ground water and residential wells since these analyses were performed using the CLP SOW OLC02.1 which does not require the analysis of MS/MSDs. MS/MSD analyses were also not performed with the SVOC or metals analyses of air samples. The lack of MS/MSD analyses for these matrices did not have an adverse impact on the usability of the data.

In general, organic MS/MSD recovery nonconformances affected the spiked sample only. Inorganic MS recovery nonconformances affected all samples of the same matrix in the affected SDG. Table 9 summarizes MS/MSD recovery nonconformances that resulted in unusable data for either fraction.

Overall Effect of MS/MSD Recoveries on Usability of Data: *Results were not significantly affected by the potential low or high biases caused by MS/MSD recovery nonconformances. This was due to one or more factors, (1) the availability of other data points for the same matrix in the case of lagoon sludge and sediment, (2) good correlation of results with other rounds of sampling as in the cases of ground water and residential wells, (3) analytes were not identified as COCs during the human health or ecological risk assessments as in the cases of surface water, sediment, and warehouse soils, or (4) results were not used for risk assessment as in the case of floor drain sludge. However, the mercury results in 17 of 52 sediment samples and the arsenic results in 12 of 116 lagoon sludge samples were rejected during validation and were therefore not usable for project quality objectives. Based on other data points for the same matrix, arsenic was identified as a COC in lagoon sludge and mercury was identified as a COC in sediment. Therefore, the inability to use these rejected data points did not adversely affect the overall decision made during the human health and/or ecological risk assessments since other samples of the same matrix contributed to the identification of these analytes as COCs. The antimony results in the floor drain sludge samples should not be used to characterize these samples due to extremely low recoveries in the MS analyses.*

3.2.6 PE Samples

PE samples served as a single-blind check on the laboratory's accuracy. PE samples were scheduled to be submitted to the laboratory at a frequency of one per SDG per matrix per parameter. It should be noted that PE samples were not available for PCB homologue, TCLP SVOC, TCLP pesticide, AVS/SEM, TCO analyses, or any analyses associated with the air

matrix. In addition, soil PE samples were not available for hexavalent chromium analyses; aqueous PEs were used for all hexavalent chromium analyses, whether associated with solid or aqueous samples. Aqueous PE samples were submitted with all aqueous samples submitted for dioxin/furan analyses. However, due to the lack of availability of certified values from the vendor, EPA-OEME used these PE samples as laboratory control spikes in the evaluation of the associated sample data.

PE samples were not submitted for any parameters associated with the floor drain sludge samples or the outfall surface water samples, and the TCLP lead and chromium analyses associated with lagoon sludge test pit samples. The floor drain sludge and outfall surface water samples were not scheduled to be collected as part of this investigation. At the request of the EPA Remedial Project Manager, these samples were collected in an effort to determine approximate concentrations in sludge discovered under the floor drain in the warehouse and in the surface water in the outfall. Since these data were not used for risk assessment purposes, the lack of a PE sample did not affect the overall usability of the data. Due to the high levels of total metals concentrations in select lagoon sludge test pit samples, the TCLP lead and chromium analyses were deemed necessary in order to determine the extent of contaminant levels for purposes of disposal. PE samples were not submitted with these samples since the original samples, which were sent to a RAS laboratory for total metals analysis, were transferred to a DAS laboratory for the TCLP analyses. Since the intended use of the data for these samples was simply for disposal purposes and not to be used in risk assessment, data are still usable and minimally affected by the lack of a PE sample.

Table 10 summarizes the frequency of PE sample analyses per matrix as well as the potential effects on the usability of the data based on the PE results.

Overall Effect of PE Sample Results on Usability of Data: *TCLP mercury results were not usable in 16 of 27 lagoon sludge samples. Butylbenzylphthalate endosulfan II, and cyanide results were not usable in the lagoon sludge test pit and/or Woods Road Disposal Area test pit samples. These analytes were not identified as COCs at any location on the site and therefore the lack of these data points in the test pit matrix most likely did not significantly affect the overall usability of the data or decisions made.*

3.3 Field Precision

Field precision was measured by the collection of field duplicates at a frequency of one for every 20 samples per matrix per parameter. For solid and aqueous samples, field duplicates were duplicate subsamples. That is, these samples were collected by taking two aliquots of the same sample, containerizing the samples, and submitting them to the laboratory for analysis as two separate samples. For air samples, field duplicates were collocated samples. That is, these samples were collected next to each other at the same sample location. The relative percent difference (RPD) criterion was 30 percent for aqueous samples and 50 percent for solid and air samples unless the concentration for either the sample or the duplicate was less than two times the quantitation limit, in which case the criterion was doubled for organics. For inorganics, if the RPD exceeded the criterion, the difference between the sample and duplicate result must be less

than two times the quantitation limit for aqueous and less than four times the quantitation limit for solid and air samples.

Table 11 summarizes the field duplicate samples collected during the RI. Field duplicates were collected at the project-specified frequency for all matrices. Figures 12 through 28 summarize the average RPDs for the field duplicate pairs for each matrix. In general, the RPDs were deemed reasonable. In several instances, high RPDs resulted from the low levels detected in both the original sample and field duplicate sample. It should be noted that none of the data collected during this RI were deemed unusable on the basis of field duplicate results.

Overall Effect of Field Duplicate Results on Usability of Data: *In general, field duplicate precision criteria were met. The overall usability of the RI data was not impacted by the field duplicate results.*

3.4 Analytical Precision

Analytical precision was measured by the analyses of MS/MSD samples for organic parameters and laboratory duplicate samples for inorganic parameters. MS/MSDs or duplicate samples were scheduled to be analyzed at a frequency of at least one for every 20 samples per matrix per parameter. MS/MSD or duplicate analyses were performed at the project-specified frequency.

Table 12 summarizes samples submitted for MS/MSD or laboratory duplicate analyses with each sampling event. It should be noted that MS/MSD analyses were not performed on most analyses associated with the floor drain sludge, outfall surface water and soil boring samples. These samples were not scheduled to be collected as part of this RI and were simply used to characterize the matrix of interest and not for risk assessment purposes. In addition, MS/MSD analyses were not performed with the pesticide/PCB analyses of ground water and residential wells since these analyses were performed using the CLP SOW OLC02.1 which does not require the analysis of MS/MSDs. The lack of MS/MSD analyses for these matrices did not have an adverse impact on the usability of the data.

None of the data collected during this RI were deemed unusable on the basis of laboratory duplicate or MS/MSD results.

3.5 Sensitivity

Sensitivity was assessed by the evaluation of analytical quantitation limits and the recoveries of target analytes in the laboratory fortified blanks (LFBs). Quantitation limit requirements were established at the onset of the Pownal Tannery investigation and were based upon action levels, instrument sensitivity and information provided by the laboratory. However, these values were considered target values only, as actual quantitation limits were affected by numerous factors, including percent moisture in the samples, matrix interferences, sample preservation, and sample dilutions. Several samples required dilutions due to target analytes which exceeded the calibration range in the initial undiluted analysis. Quantitation limits were not adversely affected by these dilutions since the results of the undiluted and diluted analyses were combined during

validation in order to report the lowest possible quantitation limits and all results within the calibration range.

The quantitation limits were evaluated for each parameter and matrix to determine if these limits were at or below the contract required quantitation limit (CRQL), the contract required detection limit (CRDL) or the quantitation limits required in the associated DAS Analytical Specification.

Table 13 summarizes the samples and parameters which did not achieve the project requirements for sensitivity and the reason for this lack of achievement. The following list summarizes the matrices and parameters which met all project requirements for sensitivity.

Lagoon Sludge:	hexavalent chromium, TCLP SVOCs, TCLP pesticides, metals, cyanide
Floor Drain Sludge:	TCLP SVOCs, TCLP pesticides, metals, cyanide, TCLP metals, pesticides, hexavalent chromium
Warehouse Soils:	VOCs, metals, cyanide, hexavalent chromium
Surface Soils:	VOC, SVOC, PCB, metals, cyanide, hexavalent chromium
Test Pit Soils (Woods Rd):	VOCs, SVOCs, metals, cyanide, pesticides, PCBs, TCLP Pb, and TCLP Cr
Test Pit Soils (Lagoon sludge):	VOCs, metals, cyanide
Sediment:	TOC/TCO, hexavalent chromium, metals/cyanide
Ground Water:	VOCs, hexavalent chromium, metals, cyanide, pesticides, PCBs
Outfall Surface Water:	VOCs, SVOCs, metals, cyanide, pesticides, PCBs
Residential Wells:	VOCs, SVOCs, metals, cyanide, pesticides, PCBs, hexavalent chromium
Surface Water:	hexavalent chromium, VOCs, metals, cyanide
Soil Borings:	VOCs, metals, cyanide, TOC/TCO

It should be noted that several analytes were reported by more than one methodology. For the analysis of ground water and residential well samples, vinyl chloride and 1,1-dichloroethene were reported in the full scan VOC analysis and the VOC/selective ion monitoring (SIM) analysis. The results of the VOC/SIM analysis were used since these analyses provided the lower quantitation limits for these analytes. For the analysis of ground water, residential well samples, and surface water samples, benzo(a)pyrene and dibenz(a,h)anthracene were reported in the full scan SVOC analysis and the SVOC/SIM analysis. In almost all cases, the results of benzo(a)pyrene and dibenz(a,h)anthracene from the SVOC/SIM analysis were used since these analyses provided the lower quantitation limits for these analytes.

LFBs consisted of clean water or clean soil spiked with all target analytes prior to preparation and/or analysis at the required quantitation limit, to assess the overall efficiency of the analytical method at the required quantitation limit. LFBs were scheduled to be analyzed at a frequency of one per 20 samples per matrix per parameters analyzed through the DAS program. LFBs were

performed at the project-specified frequency for all parameters and matrices with the exception of metals in air samples. It should be noted that LFBs were not required for any analyses performed under the RAS program. Table 14 summarizes analytes which exhibited less than 10 percent recovery in the LFBs; the results for these analytes should be used with caution and may have been rejected in accordance with Tier II or III data validation protocols.

Overall Effect of Sensitivity Issues on Usability of Data: *In general, there were minimal adverse effects to the usability of the data based on the sensitivity evaluation.*

Lagoon Sludge:

- *Several of the lagoon sludge samples submitted for SVOC analysis exhibited quantitation limits did not meet project requirements. Of these, 67% from Lagoon #1 and 33% from Lagoon #5 exhibited results for a COC which exceeded the PRG. The elevated quantitation limits therefore did not affect the overall decision made using these data. The remaining samples exhibited quantitation limits which exceeded the PRGs. Since the majority of samples from the lagoon sludge exhibited acceptable quantitation limits for the SVOC analysis, the overall effect on the data due to the select exceedances was minimal.*
-
- *Several of the lagoon sludge samples submitted for VOC and pesticides/PCB analyses exhibited quantitation limits did not meet project requirements. VOCs and pesticides/PCBs were not identified as COCs during the risk assessment. Since the majority of samples from the lagoon sludge exhibited acceptable quantitation limits for the VOC and pesticide/PCB analysis, the overall effect on the data due to the select exceedances was minimal.*

Warehouse Soils:

- *Only one out of 28 warehouse soil samples submitted for SVOCs analysis exhibited quantitation limits which exceeded project requirements. This sample contained 2 COCs which exceeded the PRGs. The elevated quantitation limits therefore did not affect the overall decision made using these data.*

Floor Drain Sludge:

- *The inability of the laboratory to achieve the project-required quantitation limits for the floor drain sludge did not adversely impact the usability of the data since these results were used only to characterize this material and not for risk assessment purposes.*

Air:

- *All of the air samples exhibited quantitation limits for all SVOCs which exceeded the project requirements. For the majority of analytes, the reported quantitation limits were still below the project action limits and the overall usability of the data was therefore not affected.*

Surface Soils:

- *Only one out of 15 surface soils exhibited a quantitation limit for one pesticide which exceeded the project requirements. Since the associated pesticide was not a COC at the site, and the quantitation limits for pesticides in the remaining surface soils were acceptable, the overall usability of the data was not affected.*

Summary Statements:

- *In general, the majority (> 90%) of the data from the warehouse soils, surface soils, test pit soils, river sediment, ground water, river surface water, and soil borings met the project-required quantitation limits. Minor nonconformances observed in Table 13 did not significantly affect the risk assessment objectives.*

- *None of the compounds listed in Table 14 were adversely impacted by the poor recoveries in the LFBs due to one or more factors including (1) the availability of other data points for the same matrix, (2) good correlation of results with other rounds of sampling, or (3) analytes were not identified as COCs during the human health or ecological risk assessments.*

3.6 Completeness

Completeness is defined as the measure of the amount of valid data obtained from a measurement system compared to the amount that was expected. For the Pownal Tannery site, completeness was assessed by comparing (1) the number of samples successfully analyzed to the number submitted, and (2) the number of valid measurements to the number of measurements obtained. Completeness was calculated according to the following equation:

$$\% \text{ Completeness} = \frac{\#\text{ of Valid Results or Samples}}{\#\text{ of Expected Results or Samples}} \times 100$$

All samples submitted for laboratory analysis for the requested parameters were successfully analyzed (100 percent completeness).

Figures 29 through 39 summarize the percentage of valid versus rejected data for each matrix. As demonstrated in these figures, >90% completeness was achieved for each matrix.

3.7 Representativeness

Representativeness expresses the degree to which the data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary. Representativenss is a qualitative parameter which is dependent upon the proper design of the sampling program and the laboratory quality control program.

Representativenss in the field was dependent upon the proper design of the sampling program and was satisfied by following the QAPP and using proper sampling, sample handling, and sample preservation techniques.

Representativenss in the laboratory was ensured by using the proper analytical procedures, appropriate methods, and meeting sample holding times.

Region 1 defines soil samples as soils, sediments, and sludge samples containing greater than 30 percent solids. Therefore, soils, sediments, or sludge samples containing less than 30 percent solids constitute a different matrix under Region 1 and the results obtained using procedures designed for solid samples may not be representative of the actual matrix. Under Region 1, nondetect results for samples with less than 30 percent solids cannot be used to achieve project quality objectives. In addition, positive and nondetect results for samples with less than 10 percent solids cannot be used to achieve project quality objectives. During the Pownal Tannery RI, no solid samples were encountered with less than 10 percent solids. However, special attention was given to potential high-moisture samples during this investigation. Based on a visual observation in the field, all potentially high-moisture samples were sent to laboratories capable of freeze-drying the samples. This method allows the laboratory to increase the solids content of the sample without compromising the sample. The freeze-drying procedure was applicable to all extractable organic procedures, metals/cyanide, and hexavalent chromium analyses. This procedure was not applicable to the VOC analyses; at this time, there is no corrective action for high-moisture samples submitted for VOC analyses. There were several instances where samples were not suspected to be high-moisture and were subsequently sent to a RAS laboratory for analysis where it was determined that the samples did contain less than 30 percent solids. In these instances, corrective action was not available due to the lack of freeze-drying capabilities at the RAS laboratories. There were also several instances where the samples were sent to a DAS laboratory but the laboratory inadvertently omitted the freeze-drying step. Table 15 summarizes the samples which contained less than 30 percent solids and therefore required qualification in accordance with Tier II or III data validation protocols.

Overall Effect of Representativeness Issues on Usability of Data: *Several of the samples collected from Lagoon #1 yielded results which were rejected for one or more parameters during validation due to the low percent solids and were therefore unusable. Less than 10% of the sediment samples yielded results which were rejected for one or more parameters due to the low percent solids and were therefore unusable. Since the majority of data for the samples collected from Lagoon #1 and the majority of data for the sediment samples were usable, the overall effect on the usability of the data was minimal since a representative number of valid samples were available to adequately characterize and determine risk from these matrices.*

3.8 Comparability

Comparability expresses the confidence with which one data set can be compared to another.

Comparability in the field was dependent upon the proper design of the sampling program and was satisfied by ensuring that the QAPP was followed and using proper and consistent sampling techniques. Maximization of comparability between rounds of ground water and residential well

sampling was achieved because the sampling design and field protocols were consistent throughout the investigation.

Comparability of laboratory results was dependent on the use of recognized EPA or equivalent analytical methods and the reporting of data in standardized units. Laboratory procedures were consistent throughout the RI resulting in acceptable comparability of ground water and residential well samples.

Tables 16 and 17 summarize the comparability of sample results for ground water and residential well samples, only for analytes which were detected in the majority of the sampling rounds above the quantitation limit.

4.0 CONCLUSIONS

The previous sections focused on the evaluation of data with respect to individual data quality indicators. Results which were deemed unusable on the basis of these evaluations were further evaluated to determine the overall effect on the achievement of project quality objectives listed in Section 1.0.

The following conclusions can be drawn from this evaluation.

- Project quality objectives were achieved for all river surface water, ground water, soil boring, residential well, Woods Road disposal area test pit, outfall surface water, and air samples.

- With the exception of hexavalent chromium results, project quality objectives were achieved for surface soil, river sediment, warehouse soil, Phase I lagoon sludge, and floor drain sludge samples.

- Hexavalent chromium results in Phase I and Phase II lagoon sludge, floor drain sludge, warehouse soil, surface soil, and river sediment samples are not usable for project quality objectives. Further sampling and analysis of these matrices for hexavalent chromium is recommended in order to determine the nature and extent of contamination for this parameter.

- With the exception of hexavalent chromium results and the majority of the TCLP mercury results, project quality objectives were achieved for Phase II lagoon sludge samples. In order to further define waste characteristics of this matrix, further sampling and analysis is recommended since mercury has been identified as a COC at this site.

- In general, project quality objectives were achieved for the lagoon sludge test pit samples. However, caution should be used in any decisions made in regards to the benzo(a)pyrene result in sample TP-508. The result for this analyte was flagged as being potentially biased low. The reported result for benzo(a)pyrene in this sample fell just below the human health PRG and may have exceeded the PRG if all DQOs have been achieved for this sample.

TABLES

Table 1
Summary of Sample Numbers and Analytical Parameters Per Matrix

Matrix	VOCs	SVOCs	Metals/ Cyanide	Pesticides/ PCBs	PCB Homologs	Dioxin/ Furans	TCLP*	Cr6+	TCO/ TOC	AVS/ SEM	Totals
Lagoon Sludge	110	116	116	115	NA	50	108	14	NA	NA	629
Floor Drain Sludge	2	2	2	2	NA	2	8	2	NA	NA	20
Warehouse Soils	12	28	28	NA	NA	NA	NA	7	NA	NA	75
Surface Soils	15	15	15	15	NA	7	NA	5	NA	NA	72
Test Pit Soils (Woods Road Disposal Area)	18	18	18	18	NA	NA	9	NA	NA	NA	81
Lagoon Test Pits	19	19	19	19	NA	NA	NA	NA	NA	NA	76
River Sediment	51	52	52	52	51	51	NA	12	51	11	383
Ground Water	101	101	101	26	NA	28	NA	28	NA	NA	385
Outfall Surface Water	2	2	2	2	NA	NA	NA	NA	NA	NA	8
Residential Wells	24	24	22	11	NA	11	NA	11	NA	NA	103
River Surface Water	23	23	23 - total metals and cyanide 23 - dissolved metals	NA	NA	22	NA	6	NA	NA	120
Soil Borings	1	1	1	NA	NA	NA	NA	NA	10	NA	13
Air	NA	6	6	NA	NA	NA	NA	NA	NA	NA	12
Totals	378	401	422	260	51	171	125	85	61	11	1965

NA = Not Applicable; listed matrix not analyzed for this parameter
VOCs = Volatile Organic Compounds
SVOCs = Semivolatile Organic Compounds
PCBs = Polychlorinated Biphenyls
TCLP = Toxicity Characteristic Leaching Procedure
Cr6+ = Hexavalent Chromium
TCO = Total Combustible Organics
TOC = Total Organic Carbon
AVS/SEM = Acid Volatile Sulfide/Simultaneously Extracted Metals
* = includes TCLP SVOCs, TCLP pesticides, TCLP metals, ignitability, reactivity, and corrosivity with the exception of the test pits where TCLP includes TCLP lead and TCLP chromium only

Table 2
Summary of SOW or Analytical Specifications Used for the Samples Collected at Pownal Tannery

Matrix	VOCs	SVOCs	Metals/ Cyanide	Pesticides/ PCBs	PCB Homologs	Dioxin/ Furans	TCLP*	Cr6+	TCO/ TOC	AVS/ SEM
Lagoon Sludge	D-007	OLM04.2 D-012	ILM04.1 D-003	OLM04.2 D-008	NA	D-006	D-045 D-047 D-048	D-001	NA	NA
Floor Drain Sludge	D-007	D-012	D-003	D-008	NA	D-006	D-045 D-047 D-048	D-001	NA	NA
Warehouse Soils	D-007	OLM04.2	ILM04.1	NA	NA	NA	NA	D-001	NA	NA
Surface Soils	D-007	OLM04.2	ILM04.1	OLM04.2	NA	D-006	NA	D-001	NA	NA
Test Pit Soils (Woods Road Disposal Area)	D-007	OLM04.2	ILM04.1	OLM04.2	NA	NA	D-045	NA	NA	NA
Lagoon Test Pits	D-007	OLM04.2	ILM04.1	OLM04.2	NA	D-006	NA	D-001	NA	NA
River Sediment	D-007	OLM04.2 D-012	ILM04.1 D-003	OLM04.2 D-008	D-013	D-006	NA	D-001	D-005	D-011
Ground Water	D-010	D-009	D-004	OLC02.1	NA	D-006	NA	D-002	NA	NA
Outfall Surface Water	OLM04.2	OLM04.2	ILM04.1	OLM04.2	NA	NA	NA	NA	NA	NA
Residential Wells	D-010	D-009	D-004	OLC02.1	NA	D-006	NA	D-002	NA	NA
River Surface Water	D-010	D-009	D-004	NA	NA	D-006	NA	D-002	NA	NA
Soil Borings	D-007	OLM04.2	ILM04.1	NA	NA	NA	NA	NA	D-005	NA
Air	NA	D-061	D-062	NA	NA	NA	NA	NA	NA	NA

NA = Not Applicable; listed matrix not analyzed for this parameter
VOCs = Volatile Organic Compounds
SVOCs = Semivolatile Organic Compounds
PCBs = Polychlorinated Biphenyls
TCLP = Toxicity Characteristic Leaching Procedure
Cr6+ = Hexavalent Chromium
TCO = Total Combustible Organics
TOC = Total Organic Carbon
AVS/SEM = Acid Volatile Sulfide/Simultaneously Extracted Metals
* = includes TCLP SVOCs, TCLP pesticides, TCLP metals, ignitability, reactivity, corrosivity
All DAS Analytical Specifications are defined on the following page.

D-001	Analytical Specification for the Analysis of Hexavalent Chromium (Cr(VI)) in Soil, Sediment, and Solid Samples (including Solid Samples with High Moisture Content)
D-002	Analytical Specification for the Analysis of Hexavalent Chromium (Cr(VI)) in Aqueous Samples
D-003	Analytical Specification for the Analysis of Metals in Solid Samples (including Samples with High Moisture Content)
D-004	Analytical Specification for the Analysis of Low Concentration Metals in Aqueous Samples
D-005	Analytical Specification for the Analysis of Total Organic Carbon, Total Combustible Organics, Grain Size, Moisture (Solids) Content, and pH in Soil, Sediment, and Solids
D-006	Analytical Specification for the Analysis of Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans in Aqueous, Soil, Sediment, Ash, and Other Solid Matrix Samples (including Samples with High Moisture Content) by High Resolution Mass Spectrometry
D-007	Analytical Specification for the Analysis of Volatile Organic Compounds in Soil Samples
D-008	Analytical Specification for the Analysis of Organochlorine Pesticides and/or Polychlorinated Biphenyls (Aroclors) in Solid Samples (including Solid Samples with High Moisture Content)
D-009	Analytical Specification for the Analysis of Low Concentration Semivolatile Organic Compounds in Aqueous Samples
D-010	Analytical Specification for the Analysis of Low Concentration Volatile Organic Compounds in Aqueous Samples
D-011	Analytical Specification for the Analysis of Acid Volatile Sulfide and Selected Simultaneously Extracted Metals in Sediment/Peat Samples
D-012	Analytical Specification for the Analysis of Semivolatile Organic Compounds in Solid Samples with High Moisture Content
D-013	Analytical Specification for the Analysis of Low Concentration Polychlorinated Biphenyls (as Homologs) in Solid Samples (including Solid Samples with High Moisture Content)
D-045	Analytical Specification for the Analysis of Metals in Solid and Aqueous Samples via the Toxicity Characteristic Leaching Procedure (TCLP) and Hazardous Waste Characteristics (Ignitability, Corrosivity [pH], Reactive Cyanide, and Reactive Sulfide)
D-047	Analytical Specification for the Analysis of Semivolatile Organic Compounds in Solid and Aqueous Samples using the Toxicity Characteristic Leaching Procedure (TCLP)
D-048	Analytical Specification for the Analysis of Pesticides in Solid and Aqueous Samples using the Toxicity Characteristic Leaching Procedure (TCLP)
D-061	Analytical Specification for the Analysis of Semivolatile Organic Compounds in Ambient Air Samples
D-062	Analytical Specification for the Analysis of Metals in Particulate Air Samples

Table 3
Summary of Contaminants Detected in Rinsate Blanks

Matrix	VOCs	SVOCs	Pesticides
Lagoon Sludge	methylene chloride	bis(2-ethylhexyl)phthalate phenol (2.6%) benzaldehyde	endrin ketone (7.8%) endrin aldehyde (7.8%) alpha-chlordane (4.3%) heptachlor (0.87%)
Warehouse Soils	NA	benzaldehyde	NA
Surface Soils	toluene (53%)	benzaldehyde	NA
Test Pit Soils (including Woods Road and Lagoon)	acetone methylene chloride	NA	NA
River Sediment	acetone	benzaldehyde	NA
Ground Water	acetone methylene chloride 2-butanone toluene (12%)	acetophenone (1%) caprolactam (1%) benzaldehyde diethylphthalate	NA
River Surface Water	toluene (4.3%)	bis(2-ethylhexyl)phthalate	NA
Soil Borings	NA	NA	NA

NA = Not applicable; no contaminants detected in the rinsate blank for this parameter
Percentage refers to the percentage of samples of that matrix potentially affected by the blank contamination.

Table 4
Summary of Contaminants Detected in Trip Blanks

Matrix	VOCs Detected
Lagoon Sludge	methylene chloride acetone 2-butanone tetrachloroethene (9.1%) methyl acetate (0.9%)
Floor Drain Sludge	2-butanone
Warehouse Soils	acetone ethylbenzene (17%) xylenes (83%) tetrahydrofuran (100%)
Surface Soils	acetone
Test Pit Soils (including Woods Road and Lagoon)	toluene (8.1%) trichloroethene (8.1%) methyl acetate (2.7%) 1,1-dichloroethane (14%)
River Sediment	methylene chloride acetone
Ground Water	methylene chloride acetone 2-butanone 1,1-dichloroethene (1%) toluene (4.9%) tetrachloroethene (1%)
Outfall Surface Water	methylene chloride
Residential Wells	acetone
River Surface Water	methylene chloride acetone 2-butanone methyl t-butylether (4.3%) toluene (4.3%)
Soil Borings	NA

NA = Not applicable; no contaminants detected in the trip blanks associated with this matrix.
Percentage refers to the percentage of samples of that matrix potentially affected by the blank contamination.

Table 5
Summary of Holding Time Issues

Matrix	Percentage of Samples Which Met Holding Time	Sample ID	Holding Time Exceedance	Overall Effect on Data
Lagoon Sludge	94.6%*	SBL1-14 (8-11)	SVOC extraction	None; PCP >PRG**
			Silver analysis	None; As >PRG**
		SBL3A-03 (5-7)	SVOC extraction	None; All detection limits >PRG**
		SBL5-08 (2-4)	SVOC extraction	Low bias
			Silver analysis	
		SBL5-10 (10-12)	SVOC extraction	Low bias
			Silver analysis	
		SBL1-01 (3-5)	SVOC extraction	Low bias
			Silver analysis	
		SBLE1-03 (0-0.5)	Dioxins/Furans	
		SBL1-12 (5-8)	SVOC extraction	None; PCP >PRG**
			Pesticide/PCB extraction	
			Silver analysis	
		SBL1-15 (8-10)	SVOC extraction	None; PCP >PRG**
			Silver analysis	None; Hg and As >PRG**
		SBL4-28 (0-0.5)	Mercury analysis	None; As >PRG*
			Silver analysis	
		SBL5-10 (2-4)	Mercury analysis	Low bias
			Silver analysis	Low bias
		SBL1-12 (0-0.5)	Silver analysis	None; As >PRG**
		SBL1-13 (6-8)	Silver analysis	None; As >PRG**
		SBL4-29 (5-7)	Silver analysis	None; As >PRG**
		SBLE1-02 (2-4)	Silver analysis	None; Hg and As >PRG**
		SBL1-02 (2-4)	Silver analysis	None; Hg and As >PRG*
		SBL1-01 (9-12)	VOC analysis	None; VOCs not identified as COCs
		SBL4-21 (6-8)	Corrosivity analysis	None
		SBL3B-01 (7-10)	Corrosivity analysis	None
		SBL3AB-01 (4-6)	Corrosivity analysis	None
		SBL3A-02 (6-8)	Corrosivity analysis	None
		SBL3A-03 (5-7)	Corrosivity analysis	None
		SBL1-02 (2-4)	Reactive cyanide analysis	None; Reactive sulfide exceeds regulatory limit
			Reactive sulfide analysis	
		SBL1-15 (8-10)	Reactive cyanide analysis	Low bias
			Reactive sulfide analysis	
		SBLE1-03 (4-7)	TCLP SVOC extraction	None; Reactive sulfide exceeds regulatory limit**
Floor Drain Sludge	90%	FD-01	Silver analysis	None; As >PRG**
		FDE-01	Silver analysis	None; As >PRG**
Warehouse Soils	100%*	NA	NA	NA
Surface Soils	100%*	NA	NA	NA

Table 5
Summary of Holding Time Issues

Matrix	Percentage of Samples Which Met Holding Time	Sample ID	Holding Time Exceedance	Overall Effect on Data
Test Pit Soils (including Woods Road and lagoon)	98.0%	TP-501	SVOC extraction	None; benzo(a)pyrene >PRG**
		TP-502	SVOC extraction Pesticide/PCB extraction	None; benzo(a)pyrene >PRG**
		TP-506	SVOC extraction	Low bias
		TP-508	SVOC extraction	Low bias; benzo(a)pyrene just below PRG
		TP-500	SVOC extraction	Low bias
River Sediment	86.9%	SD-009	SVOC extraction	Most COCs well below ecological PRGs with the exception of diethyl-phthalate
		SD-010	SVOC extraction	Low bias
		48 of 51	TOC analysis	None
		SD-039	Cr6+ analysis	Not usable
Ground Water	98.7%*	MW-B-7 (March 2000)	Dioxin/furan extraction	Low bias
		MW-110R (December 2000)	VOC SIM analysis	None; results compared well with previous rounds
		MW-107R (December 2000)	VOC SIM analysis	None; results compared well with previous rounds
		MW-107U (December 2000)	VOC SIM analysis	None; results compared well with previous rounds
		MWE-L-3 (December 2000)	VOC SIM analysis	None; results compared well with previous rounds
Outfall Surface Water	100%	NA	NA	NA
Residential Wells	95.1%	RW-001 (May 2000)	Dioxin/furan extraction	Low bias
		RW-002 (May 2000)	Dioxin/furan extraction	Low bias
		RWE-002 (May 2000)	Dioxin/furan extraction	None; Dioxin TEQ rejected due to other QC nonconformance
		RW-003 (May 2000)	Dioxin/furan extraction	None; Dioxin TEQ >PRG**
		RW-004 (May 2000)	Dioxin/furan extraction	None: Dioxin TEQ rejected due to other QC nonconformance
River Surface Water	92.5%*	SW-011	Dioxin/Furan extraction	None; not a COC
		SW-012	Dioxin/Furan extraction	None; not a COC
		SW-026	Dioxin/Furan extraction	None; not a COC
		SW-020	Dioxin/Furan extraction	None; not a COC
		SW-0L2	Dioxin/Furan extraction	None; not a COC
		SW-0L4A	Dioxin/Furan extraction	None; not a COC

Table 5
Summary of Holding Time Issues

Matrix	Percentage of Samples Which Met Holding Time	Sample ID	Holding Time Exceedance	Overall Effect on Data
		SW-0L4B	Dioxin/Furan extraction	None; not a COC
		SW-0L4C	Dioxin/Furan extraction	None; not a COC
		SW-009	Dioxin/Furan extraction	None; not a COC
Soil Borings	46.2%	MW-110R	SVOC extraction	None; benzo(a)anthracene and benzo(a)pyrene >PRG**
		MW-104U	TOC analysis	None; result still usable to evaluate soil type
		MWE-104U	TOC analysis	None; result still usable to evaluate soil type
		MW-110R	TOC analysis	None; result still usable to evaluate soil type
		MW-106U	TOC analysis	None; result still usable to evaluate soil type
		MW-103U	TCO analysis	None; result still usable to evaluate soil type
		MW-107U	TCO analysis	None; result still usable to evaluate soil type
Air	100%	NA	NA	NA

*The pH or sulfide analyses of select samples were performed outside of the holding time; since these analyses were performed as a supplement to the hexavalent chromium analysis in order to determine characteristics of the matrix, these analyses were not considered crucial to the program and were not included in the calculation of the percentage.

NA = Not Applicable; all samples of this matrix were prepared/analyzed within holding time.

SVOC= Semivolatile organic compound
PCP = Pentachlorophenol
PRG = Preliminary Remediation Goal
VOCs = Volatile Organic Compounds
COCs = Contaminants of Concern
TCLP = Toxicity Characteristic Leaching Procedure
PCB = Polychlorinated Biphenyl
TOC = Total Organic Carbon
Cr6+ = Hexavalent chromium
SIM = Selective Ion Monitoring
TCO = Total Combustible Organics

** = Low bias caused by holding time exceedance does not affect usability of data since a COC exceeded the PRG or regulatory limit of interest.

Table 6
Summary of Contaminants Detected in Laboratory Blanks

Matrix	VOCs	SVOCs	Pesticides
Lagoon Sludge	acetone 2-butanone methylene chloride 1,1,1-trichloroethane (0.9%) tetrahydrofuran (0.9%) trichlorofluoromethane (0.9%) benzene (0.9%) 1,2-dichlorobenzene (4.5%)	di-n-octylphthalate benzaldehyde bis(2-ethylhexyl)phthalate diethylphthalate di-n-butylphthalate	beta-BHC (2.6%) gamma-BHC (2.6%) dieldrin (1.7%) methoxychlor (4.3%) gamma-chlordane (0.87%) heptachlor (6.1%)
Floor Drain Sludge	1,1,1-trichloroethane (100%)	bis(2-ethylhexyl)phthalate	NA
Warehouse Soils	1,1,1-trichloroethane (100%)	di-n-octylphthalate benzaldehyde	NA
Surface Soils	NA	bis(2-ethylhexyl)phthalate	NA
Test Pit Soils (including Woods Road and Lagoon)	1,1,1-trichloroethane (27%) 1,2,4-trichlorobenzene (2.7%) 2-butanone chloroform (49%) xylenes (16%) tetrahydrofuran (14%)	di-n-butylphthalate bis(2-ethylhexyl)phthalate	toxaphene (2.7%) methoxychlor (24%) delta-BHC (2.7%)
River Sediment	acetone methylene chloride 2-butanone	di-n-butylphthalate acetophenone (9.6%) bis(2-ethylhexyl)phthalate	NA
Ground Water	1,2,4-trichlorobenzene (1%)	bis(2-ethylhexyl)phthalate	NA
Outfall Surface Water	NA	NA	NA
Residential Wells	NA	NA	NA
River surface Water	acetone	bis(2-ethylhexyl)phthalate	not submitted for this parameter
Soil Borings	acetone	bis(2-ethylhexyl)phthalate	NA

NA = Not applicable; no contaminants detected in the laboratory blank for this parameter
Percentage refers to the percentage of samples of that matrix potentially affected by the blank contamination.

Table 7
Effect of Low Surrogate Recoveries on Sample Data

Matrix	Sample ID	Parameter	Overall Effect on Data
Lagoon Sludge	SBL1-14 (8-11)	PCBs	Overall effect on data minimal since majority of samples collected from the same lagoon yielded acceptable surrogate recoveries, indicating that a representative assessment of PCBs was obtained in this lagoon.
Ground Water	MW-110R/ May 2000	SVOC/SIM	None; results compared well with previous and subsequent rounds
	MW-101U/ May 2000	SVOC/SIM	None; results compared well with previous and subsequent rounds
Surface Water	SW-020	SVOC/SIM	Potential low bias
	SW-038	SVOC/SIM	Potential low bias
	SW-0L1	SVOC/SIM	Potential low bias
	SW-0L4A	SVOC/SIM	Potential low bias
Residential Wells	RW-004/ May 2000	SVOC/SIM	None; results compared well with subsequent round
	RW-08/ May 2000	SVOC	None; results compared well with subsequent round
Outfall Surface Water	OF-1/OFE-1	Pesticide	Since results were used for characterization and not for risk assessment, the usability of data was not affected.
Sediment	SD-010	Pesticide and PCB	Below ecological PRGs by at least a factor of 2 w/exception of endosulfan sulfate
	SD-043	PCB Homologues	Potential low bias
	SD-024/SDE-024	PCB Homologues	Potential low bias
	SD-022	PCB Homologues	Potential low bias
	SD-020	PCB Homologues	Potential low bias
	SD-032	PCB Homologues	Potential low bias
	SD-0L4B	PCB Homologues	Potential low bias

Table 7
Effect of Low Surrogate Recoveries on Sample Data

Matrix	Sample ID	Parameter	Overall Effect on Data
	SD-0L4C	PCB Homologues	Potential low bias
	SD-014	PCB Homologues	Potential low bias
Test Pit Soils	TPE-11/North Wall	Pesticide and PCB	Since this was a field duplicate and original sample yielded acceptable surrogate results, overall usability of data was not affected.
Warehouse Soils	SBW-7 (4-5)	VOCs	None; VOCs not identified as COCs
	SBW-11 (3-4)	VOCs	None; VOCs not identified as COCs

Table 8
Summary of Samples Submitted for MS and/or MSD Analyses

Matrix	VOCs	SVOCs	Metals/ Cyanide	Pesticides/ PCBs	PCB Homologs	Dioxin/ Furans	TCLP*	Cr6+	TCO/T OC	AVS/ SEM
Lagoon Sludge	SBL1-04 (5-8) SBL1-07 (4-7) SBL-14 (8-11) SBL3AB-01 (0-0.5) SBL4-01 (0-0.5) SBL4-15 (0-0.5) SBL4-16 (0-2) SBL4-22 (0-1) SBL5-04 (0.5-1)	SBL1-01 (3-5) SBL1-04 (5-8) SBL1-07 (4-7) SBL3A-02 (6-9) SBL3AB-01 (0-0.5) SBL4-01 (0-0.5) SBL4-15 (0-0.5) SBL4-16 (0-2) SBL4-22 (0-1) SBL4-29 (5-7) SBL5-04 (0.5-1)	SBL1-04 (5-8) SBL1-07 (4-7) SBL2-01 (0-0.5) SBL3AB-01 (0-0.5) SBL4-01 (0-0.5) SBL4-15 (0-0.5) SBL4-16 (0-2) SBL4-22 (0-1) SBL4-29 (5-7) SBL5-04 (0.5-1)	SBL3AB-01 (0-0.5) SBL4-01 (0-0.5) SBL4-15 (0-0.5) SBL4-16 (0-2) SBL4-22 (0-1) SBL4-29 (5-7) SBL5-04 (0.5-1) SBL5-10 (10-12)	NA	SBL1-11 (0-0.5) SBL5-09 (0-0.5) SBL5-05 (0.5-1) SBL7-02 (4-7)	SBL2-03 (2-4) SBL3A-02 (6-8): TCLP metals only SBL5-08 (2-4)	SBL2-05 (4-6) SBL5-05 (2-4)	NA	NA
Floor Drain Sludge	None[1]	None[1]	FD-01	FD-01	NA	FD-01	FD-01: TCLP metals/reactivity only	None[1]	NA	NA
Warehouse Soils	SBW-7 (0-2)	SBW-4 (2-4) SBW-7 (0-2)	SBW-4 (2-4) SBW-7 (0-2)	NA	NA	NA	NA	SBW-7 (0-2)	NA	NA
Surface Soils	SS-001	SS-001	SS-001	SS-001	NA	SS-001	NA	SS-001	NA	NA
Test Pit Soils (Woods Road Disposal Area)	TP-01/6' North Wall West End	TP-01/6'North Wall West End TP-12 East Side North Wall	TP-01/6'North Wall West End TP-12 East Side North Wall	TP-01/6'North Wall West End TP-12 East Side North Wall	NA	NA	TP-01/Surface TP-03/6' W. Wall	NA	NA	NA
Lagoon Test Pits	TP-501	TP-501	TP-501	TP-501	NA	NA	NA	NA	NA	NA
River Sediment	SD-003 SD-009 SD-035 SD-038	SD-003 SD-009 SD-011 SD-019 SD-035 SD-038	SD-003 SD-009 SD-011 SD-035 SD-038	SD-003 SD-011 SD-015 SD-035 SD-038 SD-043	SD-003 SD-026 SD-035 SD-038	SD-038 SD-035 SD-009 SD-003	NA	SD-035 SD-038	SD-003 SD-009 SD-035 SD-038	SD-035 SD-038
Ground water	MW-L-3 (March 2000) MW-L-6 (March 2000) MW-107U (May 2000) MW-L-5 (August 2000) MW-102U (August 2000) MW-112U (September 2000)	MW-L-3 (March 2000) MW-L-6 (March 2000) MW-107U (May 2000) MW-L-5 (August 2000) MW-102U (August 2000) MW-112U (September 2000)	MW-L-3 (March 2000) MW-L-6 (March 2000) MW-107U (May 2000) MW-L-5 (August 2000) MW-102U (August 2000) MW-112U (September 2000)	Not required	NA	MW-L-3 (March 2000) MW-L-6 (March 2000) MW-107U (May 2000) NA (August 2000) MW-114U (September 2000) NA (December 2000)	NA	MW-L-3 (March 2000) MW-L-6 (March 2000) MW-107U (May 2000) NA (August 2000) MW-114U (September 2000) NA (December 2000)	NA	NA

Table 8
Summary of Samples Submitted for MS and/or MSD Analyses

Matrix	VOCs	SVOCs	Metals/ Cyanide	Pesticides/ PCBs	PCB Homologs	Dioxin/ Furans	TCLP*	Cr6+	TCO/TOC	AVS/SEM
	MW-102U (September 2000) MW-112U (December 2000) MW-L-11 (December 2000)	MW-102U (September 2000) MW-112U (December 2000) MW-L-11 (December 2000)	MW-102U (September 2000) MW-112U (December 2000) MW-L-11 (December 2000)							
Outfall Surface Water	None[1]	None[1]	OF-1	None[1]	NA	NA	NA	NA	NA	NA
Residential Wells	RW-001 (May 2000) RW-001 (August 2000)	RW-001 (May 2000) RW-001 (August2000)	RW-001 (May 2000) RW-001 (August 2000)	Not required	NA	RW-001 (May 2000)	NA	RW-001 (May 2000)	NA	NA
River Surface Water	SW-003 SW-020	SW-003 SW-020	SW-020 (dissolved) SW-020 (total) SW-003 (dissolved) SW-003 (total)	NA	NA	SW-028 SW-003	NA	SW-020	NA	NA
Soil Borings	None[1]	None[1]	None[1]	NA	NA	NA	NA	NA	MW-102U	NA

NA = Not Applicable; listed matrix not analyzed for this parameter.
VOCs = Volatile Organic Compounds
SVOCs = Semivolatile Organic Compounds
PCBs = Polychlorinated Biphenyls
TCLP = Toxicity Characteristic Leaching Procedure
Cr6+ = Hexavalent Chromium
TCO = Total Combustible Organics
TOC = Total Organic Carbon
AVS/SEM = Acid Volatile Sulfide/Simultaneously Extracted Metals
* = includes TCLP SVOCs, TCLP pesticides, TCLP metals, and/or reactivity with the exception of the test pits where TCLP includes TCLP lead and TCLP chromium only; MS/MSD analyses not applicable to ignitability or corrosivity
[1] Only 1-2 samples submitted for analysis; data not used for risk assessment; lack of MS/MSD has no adverse effect on data.

Table 9
Analytical Accuracy
Summary of MS/MSD Nonconformances Which Resulted in Unusable Data

Matrix	Sample ID	Nonconformance	Affected Samples
Sediment	SD-009:	Mercury 0%	SD-0L4C, SD-031, SD-030, SD-042, SD-029, SD-028, SD-026, SD-025, SD-008, SD-010, SD-022, SD-020, SD-009, SD-007, SD-006, SD-0L4B, SDE-031
Lagoon Sludge	SBL1-04(5-8):	Arsenic 0%	SBL1-04 (5-8), SBL1-05 (5-8), SBL5-02 (0.5-1), SBL5-07 (0-0.5), SBLE5-02 (0.5-1), SBL5-01 (0-0.5), SBL5-03 (3-4)
	SBL1-07 (4-7):	Arsenic 0%	SBL1-08 (2-4), SBLE1-08 (2-4), SBL1-9 (5-7), SBL1-10 (6-8), SBL3A-02 (6-9), SBL3A-03 (5-7), SBL1-07 (4-7)
Floor Drain Sludge	FD-01	Antimony (total) 2%	FD-01, FDE-01

Table 10
Summary of PE Analyses

Matrix	Frequency	Overall Effect on Data Usability
Lagoon Sludge		
SVOCs	7.8% (9 PE Samples)	One PE sample affected sample results: high bias for chrysene in SBL3A-02 (6-9); chrysene not a COC so data not adversely affected.
Pesticides/PCBs	7.0% (8 PE Samples)	Acceptable results.
Hexavalent chromium	14% (2 PE Samples)	Acceptable results.
VOCs	7.3% (8 PE Samples)	None of the PE samples yielded results which affected the accuracy of sample data.
Metals/cyanide	7.8% (9 PE Samples)	2 PE samples caused low bias for cyanide in 13 lagoon sludge samples; cyanide result in sample SBL5-02 (0.5-1) not usable for project objectives; cyanide not identified as COC and acceptable in remaining 102 lagoon sludges.
Dioxin/furans	12% (6 PE Samples)	3 PEs caused high bias for OCDD in 23 lagoon sludge samples. 1 PE caused low bias for 123678-HxCDF in 8 lagoon sludge samples, 123678-HxCDF not usable in samples SBL4-16 (7-8), SBL3B-03 (14-16), SBL2-03 (9-12). 123678-HxCDF is not major contributor to overall dioxin TEQ and was acceptable in remaining 42 lagoon sludge samples.
TCLP metals	7.4% (2 PE Samples)	Mercury results not usable in 16 lagoon sludge samples
Warehouse Soils		
VOCs	8.3% (1 PE Sample)	Acceptable results
SVOCs	7.1% (2 PE Samples)	One PE sample caused high bias for chrysene in 12 warehouse soils: (chrysene not a COC so data not adversely affected)
Metals/cyanide	7.1% (2 PE Samples)	One PE sample caused high bias for barium, lead and magnesium in 16 warehouse soils. One PE sample caused low bias for aluminum in 12 warehouse soils. None of the analytes are COCs and usability of data therefore not affected.
Hexavalent chromium	14% (1 PE Sample)	Acceptable results
Surface Soils		
VOCs	6.7% (1 PE Sample)	1,1-Dichloroethane results not usable in any of the surface soils; overall usability of data not affected since VOCs not identified as COCs in surface soils
SVOCs	6.7% (1 PE Sample)	Acceptable results
Metals/cyanide	6.7% (1 PE Sample)	Cobalt and cyanide biased high in all surface soils. Cobalt and cyanide not COCs so data not adversely affected.
Pesticides/PCBs	6.7% (1 PE Sample)	Acceptable results
Hexavalent chromium	20% (1 PE Sample)	PE sample results did not affect the accuracy of the data.
Dioxin/furans	14% (1 PE Sample)	1,2,3,6,7,8-HxCDF biased low in all surface soils; OCDD

Table 10
Summary of PE Analyses

Matrix	Frequency	Overall Effect on Data Usability
		biased high in 2 surface soils: 123678-HxCDF not a major contributor to overall dioxin TEQ.
Test Pit Soils (Woods Road Disposal Area and Lagoon Sludge)		
VOCs	8.1% (3 PE Samples)	High bias for all VOCs in all lagoon test pit soils; overall usability of data not affected since VOCs not identified as COCs in surface soils
SVOCs	14% (3 PE Samples)	Butylbenzylphthalate results not usable in all lagoon sludge test pit soils; butylbenzylphthalate not a COC so data not adversely affected.
Pesticides/PCBs	14% (3 PE Samples)	Endosulfan II results not usable in 14 lagoon sludge test pits and biased low in 5 test pit soils; overall usability of data not affected since pesticides not identified as COCs
Metals/cyanide	14% (3 PE Samples)	Cyanide results not usable in 3 lagoon sludge test pit soils and biased low in 16 lagoon sludge test pit soils; cyanide not a COC so data not adversely affected.
Sediment		
VOCs	5.9% (3 PE Samples)	PE sample results did not affect the accuracy of the data.
SVOCs	7.7% (4 PE Samples)	Hexachloroethane results not usable in 40 sediment samples; high bias for chrysene, pyrene, and bis(2-ethylhexyl)phthalate in 6 sediments
Pesticides/PCBs	7.7% (pesticide: 4 PE samples) 5.8% (PCB: 3 PE samples)	High bias for all pesticides and PCBs in 6 sediments
Metals/cyanide	7.7% (metals: 4 PE Samples) (Cyanide: 4 PE Samples)	Acceptable results
Dioxin/furans	7.8% (4 PE Samples)	2 PEs caused high bias for OCDD in 33 sediment samples.
Hexavalent chromium	17% (2 PE Samples)	Acceptable results
TOC	5.9% (3 PE Samples)	High bias for TOC in 13 sediments
AVS	9.1% (1 PE Sample)	AVS results not usable in 5 sediments; biased low in 6 samples
Ground Water		
Hexavalent chromium	11% (3 PE Samples)	PE sample results did not affect the accuracy of the data.
VOCs	7.9% (8 PE Samples)	PE sample results did not affect the accuracy of the data.
SVOCs	7.9% (8 PE Samples)	Acceptable results
Pesticides/PCBs	15% (4 PE Samples)	Acceptable results
Metals/cyanide	7.9% (8 PE Samples)	High bias for potassium in all August 2000 ground water samples; not a COC High bias for cyanide in sample MW-L-9 from September 2000; not a COC High bias for calcium and iron in December 2000 ground water samples; not a COC Low bias for cyanide in samples MW-L-10, MW-B-7, and

Table 10
Summary of PE Analyses

Matrix	Frequency	Overall Effect on Data Usability
		MW-101U from December 2000; not a COC and was acceptable in previous rounds Cyanide results not usable in samples MW-L-7, MW-L-4, MW-L-11, MW-110U and MW-113R from December 2000; not a COC and was acceptable in previous rounds
Residential Wells		
VOCs	8.3% (2 PE Samples)	PE sample results did not affect the accuracy of the data.
SVOCs	8.3% (2 PE Samples)	Acceptable results
Pesticides/PCBs	9.1% (1 PE Sample)	Acceptable results
Metals/cyanide	9.1% (2 PE Samples)	Thallium results not usable in May 2000 residential well samples; thallium results in August 2000 were usable; overall data usability therefore not affected.
Hexavalent chromium	9.1% (1 PE Sample)	PE sample results did not affect the accuracy of the data.
River Surface Water		
Hexavalent chromium	0% (0 PE Samples)	Not Applicable
VOCs	13% (3 PE Samples)	Acceptable results
SVOCs	13% (3 PE Samples)	Acceptable results
Metals/cyanide	6.5% (3 PE Samples)	One PE sample caused high bias for thallium in samples SW-0L1 (total and dissolved) and SW-0L2 (dissolved).

Table 11
Summary of Samples Submitted as Field Duplicates

Matrix	VOCs	SVOCs	Metals/ Cyanide	Pesticides/ PCBs	PCB Homologs	Dioxin/ Furans	TCLP*	Cr6+	TCO/ TOC	AVS/ SEM
Lagoon Sludge	SBL1-03 (0-0.5) SBL1-08 (2-4) SBL2-05 (0-0.5) SBL4-04 (0-0.5) SBL4-11 (0-0.5) SBL4-19 (0-0.5) SBL4-24 (4-6) SBL5-02 (0.5-1) SBL5-04 (0.5-1)	SBL1-02 (2-4) SBL1-03 (0-0.5) SBL1-08 (2-4) SBL2-05 (0-0.5) SBL4-04 (0-0.5) SBL4-11 (0-0.5) SBL4-19 (0-0.5) SBL4-24 (4-6) SBL5-02 (0.5-1) SBL5-04 (0.5-1)	SBL1-02 (2-4) SBL1-03 (0-0.5) SBL1-08 (2-4) SBL2-05 (0-0.5) SBL4-04 (0-0.5) SBL4-11 (0-0.5) SBL4-19 (0-0.5) SBL4-24 (4-6) SBL5-02 (0.5-1) SBL5-04 (0.5-1)	SBL1-02 (2-4) SBL1-03 (0-0.5) SBL2-05 (0-0.5) SBL4-04 (0-0.5) SBL4-11 (0-0.5) SBL4-19 (0-0.5) SBL4-24 (4-6) SBL5-02 (0.5-1) SBL5-04 (0.5-1)	NA	SBL5-05 (0.5-1) SBL1-03 (0-0.5) SBL5-10 (0-0.5) SBL2-03 (0-0.5) SBL5-08 (0-0.5)	SBL2-05 (4-6) SBL1-03 (4-7)	SBL5-07 (2-4)	NA	NA
Floor Drain Sludge	FD-01	FD-01	FD-01	FD-01	NA	FD-01	FD-01	FD-01	NA	NA
Warehouse Soils	SBW-8	SBW-3 SBW-8	SBW-3 SBW-8	NA	NA	NA	NA	SBW-3 SBW-8	NA	NA
Surface Soils	SS-004	SS-004	SS-004	SS-004	NA	SS-004	NA	SS-004	NA	NA
Test Pit Soils (Woods Road Disposal Area)	TP-01 (0-0.5) TP-11 (3.50)	TP-01 (0-0.5) TP-11 (3.50)	TP-01 (0-0.5) TP-11 (3.50)	TP-01 (0-0.5) TP-11 (3.50)	NA	NA	None	NA	NA	NA
Lagoon Test Pits	TP-501	TP-501	TP-501	5P-501	NA	NA	NA	NA	NA	NA
River Sediment	SD-004 SD-024 SD-027 SD-031	SD-004 SD-024 SD-027 SD-031 SD-032	SD-004 SD-024 SD-027 SD-031 SD-032	SD-004 SD-024 SD-027 SD-031 SD-032	SD-004 SD-024 SD-027 SD-031	SD-004 SD-024 SD-027 SD-031	NA	SD-004 SD-024 SD-027 SD-031 SD-032	SD-004 SD-024 SD-027 SD-031	SD-024 SD-027
Ground Water	MW-L-5 (March 2000) MW-L-10 (March 2000) MW-111U (May 2000) MW-107U (August 2000) MW-L-10 (August 2000) MW-103U (September 2000) MW-107U (September 2000) MW-L-3 (December 2000)	MW-L-5 (March 2000) MW-L-10 (March 2000) MW-111U (May 2000) MW-107U (August 2000) MW-L-10 (August 2000) MW-103U (September 2000) MW-107U (September 2000) MW-L-3 (December 2000)	MW-111U (May 2000) MW-107U (August 2000) MW-L-10 (August 2000) MW-103U (September 2000) MW-107U (September 2000) MW-L-3 (December 2000) MW-104U (December 2000)	MW-B-7 (March 2000) MW-L-5 (March 2000) MW-111U (May 2000) MW-113R (September 2000)	NA	MW-B-7 (March 2000) MW-L-5 (March 2000) MW-111U (May 2000) MW-113R (September 2000)	NA	MW-111U (May 2000) MW-103U (September 2000) MW-107U (September 2000)	NA	NA

Table 11
Summary of Samples Submitted as Field Duplicates

Matrix	VOCs	SVOCs	Metals/ Cyanide	Pesticides/ PCBs	PCB Homologs	Dioxin/ Furans	TCLP*	Cr6+	TCO/ TOC	AVS/ SEM
	MW-104U (December 2000)	MW-104U (December 2000)								
Outfall Surface Water	OF-1	OF-1	OF-1	OF-1	NA	NA	NA	NA	NA	NA
Residential Wells	RW-002 (May 2000) RW-009 (May 2000) RW-004 (August 2000)	RW-002 (May 2000) RW-009 (May 2000) RW-004 (August 2000)	RW-002 (May 2000) RW-004 (August 2000)	RW-002 (May 2000)	NA	RW-002 (May 2000)	NA	RW-002 (May 2000)	NA	NA
River Surface Water	SW-005 SW-034	SW-005 SW-034	SW-005 (total and dissolved) SW-034 (total and dissolved)	NA	NA	SW-005 SW-034	NA	SW-005 SW-034	NA	NA
Soil Borings	None	None	None	NA	NA	NA	NA	NA	MW-104U	NA
Air	NA	Station 3	Station 4*	NA	NA	NA	NA	NA	NA	NA

NA = Not Applicable; listed matrix not analyzed for this parameter
VOCs = Volatile Organic Compounds
SVOCs = Semivolatile Organic Compounds
PCBs = Polychlorinated Biphenyls
TCLP = Toxicity Characteristic Leaching Procedure
Cr6+ = Hexavalent Chromium
TCO = Total Combustible Organics
TOC = Total Organic Carbon
AVS/SEM = Acid Volatile Sulfide/Simultaneously Extracted Metals
* Cyanide analysis not performed.

Table 12
Summary of Samples Submitted for MS/MSD and/or Laboratory Duplicate Analyses

Matrix	VOCs	SVOCs	Metals/ Cyanide	Pesticides/PCBs	PCB Homologs	Dioxin/ Furans	TCLP*	Cr6+	TCO/ TOC	AVS/ SEM
Lagoon Sludge	SBL1-04 (5-8) SBL1-07 (4-7) SBL-14 (8-11) SBL3AB-01 (0-0.5) SBL4-01 (0-0.5) SBL4-15 (0-0.5) SBL4-16 (0-2) SBL4-22 (0-1) SBL5-04 (0.5-1)	SBL1-01 (3-5) SBL1-04 (5-8) SBL1-07 (4-7) SBL3A-02 (6-9) SBL3AB-01 (0-0.5) SBL4-01 (0-0.5) SBL4-15 (0-0.5) SBL4-16 (0-2) SBL4-22 (0-1) SBL4-29 (5-7) SBL5-04 (0.5-1)	SBL1-04 (5-8) SBL1-07 (4-7) SBL2-01 (0-0.5) SBL3AB-01 (0-0.5) SBL4-01 (0-0.5) SBL4-15 (0-0.5) SBL4-16 (0-2) SBL4-22 (0-1) SBL4-29 (5-7) SBL5-04 (0.5-1)	SBL1-01 (3-5) SBL1-04 (5-8) SBL1-07 (4-7) SBL3AB-01 (0-0.5) SBL4-01 (0-0.5) SBL4-15 (0-0.5) SBL4-16 (0-2) SBL4-22 (0-1) SBL4-29 (5-7) SBL5-04 (0.5-1) SBL5-10 (10-12)	NA	SBL5-09 (0-0.5) SBL5-05 (0.5-1) SBL1-07 (4-7) SBL1-11 (0-0.5)	SBL2-03 (2-4) SBL3A-02 (6-8): TCLP metals only SBL5-08 (2-4)	SBL2-05 (4-6) SBL5-05 (2-4)	NA	NA
Floor Drain Sludge	None[1]	None[1]	FD-01	FD-01	NA	FD-01	FD-01: TCLP metals/reactivity only	None[1]	NA	NA
Warehouse Soils	SBW-7 (0-2)	SBW-4 (2-4) SBW-7 (0-2)	SBW-4 (2-4) SBW-7 (0-2)	NA	NA	NA	NA	SBW-7 (0-2)	NA	NA
Surface Soils	SS-001	SS-001	SS-001	SS-001	NA	SS-001	NA	SS-001	NA	NA
Test Pit Soils (Woods Road Disposal Area)	TP-01/6' North Wall West End	TP-01/6'North Wall West End TP-12 East Side North Wall	TP-01/6'North Wall West End TP-12 East Side North Wall	TP-01/6'North Wall West End TP-12 East Side North Wall	NA	NA	TP-01/Surface TP-03/6' W. Wall	NA	NA	NA
Lagoon Test Pits	TP-501	TP-501	TP-501	TP-501	NA	NA	NA	NA	NA	NA
River Sediment	SD-003 SD-009 SD-035 SD-038	SD-003 SD-009 SD-011 SD-019 SD-035 SD-038	SD-003 SD-009 SD-011 SD-035 SD-038	SD-003 SD-011 SD-015 SD-035 SD-038 SD-043	SD-003 SD-026 SD-035 SD-038	SD-035 SD-038 SD-009 SD-003	NA	SD-035 SD-038	All sediments	SD-035 SD-038
Ground water	MW-L-3 (March 2000) MW-L-6 (March 2000) MW-107U (May 2000) MW-L-5 (August 2000) MW-102U	MW-L-3 (March 2000) MW-L-6 (March 2000) MW-107U (May 2000) MW-L-5 (August 2000) MW-102U	MW-L-3 (March 2000) MW-L-6 (March 2000) MW-107U (May 2000) MW-L-5 (August 2000) MW-102U	Not required	NA	MW-L-3 (March 2000) MW-L-6 (March 2000) MW-107U (May 2000) NA (August 2000) MW-114U	NA	MW-L-3 (March 2000) MW-L-6/Round 1 MW-107U (May 2000) NA (August 2000) MW-114U (September 2000)	NA	NA

Table 12
Summary of Samples Submitted for MS/MSD and/or Laboratory Duplicate Analyses

Matrix	VOCs	SVOCs	Metals/ Cyanide	Pesticides/PCBs	PCB Homologs	Dioxin/ Furans	TCLP*	Cr6+	TCO/ TOC	AVS/ SEM
	(August 2000) MW-112U (September 2000) MW-102U (September 2000) MW-112U (December 2000) MW-L-11 (December 2000)	(August 2000) MW-112U (September 2000) MW-102U (September 2000) MW-112U (December 2000) MW-L-11 (December 2000)	(August 2000) MW-112U (September 2000) MW-102U (September 2000) MW-112U (December 2000) MW-L-11 (December 2000)			(September 2000) NA (December 2000)		NA (December 2000)		
Outfall Surface Water	None[1]	None[1]	OF-1	None[1]	NA	NA	NA	NA	NA	NA
Residential Wells	RW-001 (May 2000) RW-001 (August 2000)	RW-001 (May2000) RW-001 (August 2000)	RW-001 (May 2000) RW-001 (August 2000)	RW-001 (May 2000) RW-001 (August 2000)	NA	RW-001 (May 2000)	NA	RW-001 (May 2000)	NA	NA
River Surface Water	SW-003 SW-020	SW-003 SW-020	SW-020 (dissolved) SW-020 (total) SW-003 (dissolved) SW-003 (total)	NA	NA	SW-028 SW-003	NA	SW-020	NA	NA
Soil Borings	None[1]	None[1]	None[1]	NA	NA	NA	NA	NA	All soil borings	NA

NA = Not Applicable; listed matrix not analyzed for this parameter
VOCs = Volatile Organic Compounds
SVOCs = Semivolatile Organic Compounds
PCBs = Polychlorinated Biphenyls
TCLP = Toxicity Characteristic Leaching Procedure
Cr6+ = Hexavalent Chromium
TCO = Total Combustible Organics
TOC = Total Organic Carbon
AVS/SEM = Acid Volatile Sulfide/Simultaneously Extracted Metals
* = includes TCLP SVOCs, TCLP pesticides, TCLP metals, and/or reactivity with the exception of the test pits where TCLP includes TCLP lead and TCLP chromium only; MS/MSD analyses not applicable to ignitability or corrosivity
[1] Only 1-2 samples submitted for analysis; data not used for risk assessment; lack of MS/MSD has no adverse effect on data.

Table 13
Samples Which Did Not Achieve Sensitivity Goal

Sample ID	Parameter/ Analytes Affected	Reason for Higher Quantitation Limits
Lagoon Sludge		
SBL1-01 (9-12)	SVOCs	Select targets (10x)
SBL1-02 (2-4)	SVOCs	Select targets (5x)
SBLE1-02 (2-4)	SVOCs	Select targets (5x)
SBL1-02 (7-10)	VOCs	High-level analysis performed due to levels of analytes which would have exceeded calibration range in low-level analysis
SBL1-03 (4-7)	Aroclors 1232 and 1254	Peak interferences
	VOCs	High-level analysis performed due to levels of analytes which would have exceeded calibration range in low-level analysis
	SVOCs	Select targets (20x)
SBL1-04 (5-8)	SVOCs	Select targets (2x)
SBL1-05 (5-8)	VOCs	High-level analysis performed due to levels of analytes which would have exceeded calibration range in low-level analysis
	SVOCs	Select targets (10x)
SBL1-07 (4-7)	SVOCs	Select targets (medium-level)
SBL1-08 (2-4)	Aroclors 1232, 1248, 1254, 1260	Peak interferences
	VOCs	High-level analysis performed due to levels of analytes which would have exceeded calibration range in low-level analysis
	SVOCs	Select targets (medium-level)
SBLE1-08 (2-4)	VOCs	High-level analysis performed due to levels of analytes which would have exceeded calibration range in low-level analysis
	SVOCs	Select targets (medium-level)
SBL1-09 (5-7)	VOCs	High-level analysis performed due to levels of analytes which would have exceeded calibration range in low-level analysis
	SVOCs	Select targets (medium-level)
SBL1-10 (6-8)	VOCs	High-level analysis performed due to levels of analytes which would have exceeded calibration range in low-level analysis
	SVOCs	Select targets (medium-level)
SBL1-11 (8-11)	SVOCs	Select targets (10x)
SBL1-12 (5-8)	VOCs	High-level analysis with 20x dilution performed due to levels of analytes which would have exceeded calibration range in low-level analysis
	SVOCs	Select targets (10x)
SBLE1-12 (5-8)	VOCs	High-level analysis performed due to levels of analytes which would have exceeded calibration range in low-level analysis
SBL1-14 (8-11)	Aroclors 1232, 1248, 1254, 1260	Peak interferences

Table 13
Samples Which Did Not Achieve Sensitivity Goal

Sample ID	Parameter/ Analytes Affected	Reason for Higher Quantitation Limits
	SVOCs	Select targets (20x)
SBL1-15 (8-10)	Aroclors 1232 and 1254	Peak interferences
	VOCs	High-level analysis performed due to levels of analytes which would have exceeded calibration range in low-level analysis
	SVOCs	Select targets (10x)
SBL1-12 (5-8)	Aroclors 1232, 1248, 1254, 1260	Peak interferences
	TCLP As, Pb, Se	Dilution
SBL1-02 (2-4)	Aroclors 1232, 1254, 1260	Peak interferences
	Pesticides	Select targets (5x)
SBLE1-02 (2-4)	Aroclors 1232, 1254, 1260	Peak interferences
	Pesticides	Select targets (5x)
SBL3A-01 (6-8)	VOCs	High-level analysis performed due to levels of analytes which would have exceeded calibration range in low-level analysis
SBL3A-03 (5-7)	VOCs	High-level analysis performed due to levels of analytes which would have exceeded calibration range in low-level analysis
	SVOCs	Select targets (medium-level)
SBL3B-01 (7-10)	Pesticides/PCBs	Non-target analyte interferences (2x)
SBL3AB-01 (10-13)	Pesticides/PCBs	Non-target analyte interferences (5x)
SBL4-21 (6-8)	VOCs	High-level analysis performed due to levels of analytes which would have exceeded calibration range in low-level analysis
SBL4-29 (5-7)	Aroclors 1232, 1248, 1254, 1260	Peak interferences
SBL5-02 (0.5-1)	VOCs	High-level analysis performed due to levels of analytes which would have exceeded calibration range in low-level analysis
	SVOCs	Select targets (5x)
SBLE5-02 (0.5-1)	VOCs	High-level analysis performed due to levels of analytes which would have exceeded calibration range in low-level analysis
	SVOCs	Select targets (5x)
SBL5-07 (0-0.5)	SVOCs	Select targets (2x)
Floor Drain Sludge		
FD-01	SVOCs	Target analytes
	VOCs	High-level analysis performed due to levels of analytes which would have exceeded calibration range in low-level analysis
	Aroclor 1232, 1260	Peak interferences
FDE-01	SVOCs	Target analytes
	VOCs	High-level analysis performed due to levels of analytes which would have exceeded calibration range in low-level analysis
	Aroclors 1232, 1242, 1260	Peak interferences

Table 13
Samples Which Did Not Achieve Sensitivity Goal

Sample ID	Parameter/ Analytes Affected	Reason for Higher Quantitation Limits
Warehouse Soils		
SBW-9 (0-2)	SVOCs	Target analytes (2x)
Surface Soils		
SS-013	Endrin	Result rejected in initial analysis; needed to report from dilution
Test Pit Soils (Lagoon Sludge)		
TP-502	SVOCs	Target analytes (B2EHP) (5x)
TP-500	SVOCs	Medium level based on screening results
	Pesticides/PCBs	Target analytes (10x)
River Sediment		
SD-025	SVOCs	Target analytes (10x)
SDE-024	VOCs	High-level analysis performed due to levels of analytes which exceeded calibration range in low-level analysis; lab did not report low-level analysis due to other QC nonconformances associated with it
All sediments	mono-, di-, and trichlorobiphenyls	Lab did not meet required QLs of 0.3 µg/kg; lab reported 1.0 µg/kg
	tetra-, penta-, and hexa-chlorobiphenyls	Lab did not meet required QLs of 0.7 µg/kg; lab reported 2.0 µg/kg
	hepta-, octa-, and nonachlorobiphenyls	Lab did not meet required QLs of 1.0 µg/kg; lab reported 3.0 µg/kg
	decachlorobiphenyl	Lab did not meet required QLs of 1.5 µg/kg; lab reported 5.0 µg/kg
	AVS/SEM (affects AVS, arsenic, nickel and zinc)	Lab did not meet required QLs of 0.05 µmole/g for sulfide (reported 0.16), 0.05 µmole/g for As (reported 0.14), 0.05 µmole/g for nickel (reported 0.08), and 0.05 µmole/g for zinc (reported 0.08)
Ground water		
All From March 2000	Dibenz(a,h)anthracene	Results from SIM analysis could not be used due to LFB failure; results from full scan analysis used
River surface water		
SW-0L4B	Benzo(a)pyrene and dibenz(a,h)anthracene	Results from SIM analysis could not be used due to QC failure; results from full scan analysis used
Soil Borings		
MW-110R	SVOCs	Target analytes (medium level)
Air		
Station 1, Station 2, Station 3A, Station 3B, Station 4, Station 5	SVOCs	Target analytes
Station 1, Station 2, Station 3A, Station 4, Station 4B, Station 5	Beryllium, Arsenic	Project-required quantitation limit could not be achieved by laboratory due to analytical limitations

Table 14
Summary of LFB Nonconformances

Matrix	Analyte Affected	Samples Affected
Lagoon Sludge	4-Nitrophenol	SBL4-28 (0-0.5), SBL5-10 (2-4), SBL1-13 (6-8), SBL4-29 (5-7), SBLE1-02 (2-4), SBL1-02 (2-4)
Sediment	1,2-Dibromo-3-chloropropane	SBL1-08 (2-4), SBL1-15 (8-10)
	Pentachlorophenol	SD-014, SD-015, SD-016, SD-017, SD-018, SD-019, SD-023, SD-024, SDE-024, SD-043
Ground Water March 2000	Hexachlorocyclopentadiene	MW-L-11, MW-L-9, MW-L-10, MW-L-10E, MW-L-6, MW-B-7
	Dibenz(a,h)anthracene/SIM	All March 2000 Ground water samples
Ground Water May 2000	Benzo(a)pyrene/SIM	MW-101U, MW-110U
Ground Water September 2000	1,2-Dibromo-3-chloropropane	All September 2000 Ground water samples
	Hexachlorocyclopentadiene	MW-112U, MWE-107U, MW-107U, MW-L-9, MW-110U, MW-110R, MW-L-7, MW-114U
Ground Water December 2000	Pentachlorophenol	MW-112U, MW-106U, MW-L-9, MW-111U, MW-104U, MWE-104U, MW-103U, MW-103R
Residential Wells May 2000	Hexachlorocyclopentadiene	All May 2000 Residential well samples
Surface Water	Bis(2-chloroethyl)ether	SW-034, SWE-034, SW-038, SW-030, SW-036
	3,3'-Dichlorobenzidine	SW-034, SWE-034, SW-038, SW-030, SW-036
	Hexachlorocyclopentadiene	SW-013, SW-012, SW-011, SW-021, SW-005, SWE-005

Table 14
Summary of LFB Nonconformances

Matrix	Analyte Affected	Samples Affected
	N-nitrosodiphenylamine	SW-013, SW-012, SW-011, SW-021, SW-005, SWE-005
	Atrazine	SW-013, SW-012, SW-011, SW-021, SW-005, SWE-005
	Carbazole	SW-013, SW-012, SW-011, SW-021, SW-005, SWE-005
	3,3'-Dichlorobenzidine	SW-013, SW-012, SW-011, SW-021, SW-005, SWE-005
Air	Benzadehyde Phenol Acetophenone Naphthalene 2-Methylnaphthalene 2,4-Dinitrophenol Bento(a)anthracene Bis(2-ethylhexyl)phthalate	Station 1, Station 2, Station 3A, Station 3B, Station 4, Station 5

Table 15
Samples Affected By Low Solids Content

Matrix	Sample ID	Effect on Data
Lagoon Sludge	SBL1-03 (4-7)	VOC, SVOC (R), Pesticides/PCBs (R), metals/cyanide (R)
	SBL1-04 (5-8)	SVOC (R), Pesticides/PCBs (R)
	SBL1-05 (5-8)	VOC, SVOC (R), Pesticides/PCBs (R), metals/cyanide (R)
	SBL1-07 (4-7)	VOC, SVOC (R), Pesticides/PCBs (R), metals/cyanide (R)
	SBL1-08 (2-4)	VOC
	SBLE1-08 (2-4)	VOC, SVOC (R)
	SBL1-11 (8-11)	VOC
	SBL1-12 (5-8)	VOC, SVOC (I), hexavalent chromium (I), metals/cyanide (I)
Sediment	SD-011	VOC, SVOC (R), Pesticides/PCBs (R)
	SD-012	VOC
	SD-016	VOC
	SD-018	VOC
	SD-023	VOC

(R) = Sample sent to a RAS laboratory where freeze-drying step not performed.
(I) = DAS laboratory inadvertently omitted the freeze-drying step.

Table 16
Comparability Results- Ground Water

Sample ID	Method	Compound	March 2000	May 2000	August 2000	September 2000	December 2000	% RSD
MW-101U	Metals	Aluminum	NA	2920	28.2 B	59.8 E*	561	154.0+
		Barium	NA	95	48	46.6	52.7	38.1
		Calcium	NA	119000	81600	82100	92700	18.7
		Iron	NA	4840	36.6	418	724	149.0+
		Magnesium	NA	47400	24900	22600	25500	38.5
		Manganese	NA	214	29.2	15.3 *	18.6	139.5+
		Potassium	NA	3050	2250	1360	1940	32.8
		Sodium	NA	36900	20200	10000 N	14300	58.0
MW-102U	Metals	Calcium	NA	20900	20300	25800	33000	23.5
		Magnesium	NA	6860	6060	7530	8780	15.8
		Potassium	NA	293 B	654 B	668	646	32.1
		Sodium	NA	1310	1060	1210 J	1130	9.1
MW-103R	Metals	Aluminum	NA	150	200	52.5 UJ*	1760 E*	150.8+
		Barium	NA	44.7 B	49.4	50.4 J	67.4	18.7
		Calcium	NA	22900	27400	24300	29900	12.0
		Iron	NA	517	529	379 U	1580	74.1
		Magnesium	NA	7270	8820	9010	9850	12.3
		Manganese	NA	130	121	125 UJ	186	21.7
		Potassium	NA	586 B	810 B	579	887	21.9
		Sodium	NA	3420	1840	1440 J	5490	60.3
MW-103U	Metals	Aluminum	NA	302	43.6	46.8 UJ*	81.8 E*	104.2+
		Calcium	NA	47600	47300	46800	46000	1.5
		Iron	NA	502	52.2	205 U	216	77.0
		Magnesium	NA	2100	21700	21100	20600	58.2
		Manganese	NA	26.4	2.8 B	7 UJ	3.3	113.2+
		Potassium	NA	566 B	878 B	674	605	20.4
		Sodium	NA	2500	2740	2410 J	2250	8.3
		Zinc	NA	5.2	14	6.8 U	1.9 U	73.2

Table 16
Comparability Results- Ground Water

Sample ID	Method	Compound	March 2000	May 2000	August 2000	September 2000	December 2000	% RSD
MW-104U	Metals	Arsenic	NA	2.2 B	2.1	3.5 U	2.4	25.3
		Barium	NA	38.3 B	40.3	54.6 J	53.1	18.2
		Calcium	NA	59000	54300	75200	67600	14.5
		Iron	NA	3260	3410	5190	5120	24.8
		Magnesium	NA	10700	9270	12300	12000	12.5
		Manganese	NA	511	598	1110 J	697	36.4
		Potassium	NA	3000	4180	3310	2980	16.7
		Sodium	NA	32600	38400	55600 J	52900	24.8
MW-106U	Metals	Barium	NA	42.6 B	21.8 B	30.5 J	27.7	28.6
		Calcium	NA	64500	52600	65800	60400	9.8
		Iron	NA	1410	191	426 U	436	87.9
		Magnesium	NA	17700	13200	16600	15100	12.5
		Manganese	NA	435	40.3	44.1 UJ	73.6	129.3+
		Potassium	NA	1400	1160	983	876	20.7
		Sodium	NA	38200	23900	49100 J	35700	28.2
MW-107R	Metals	Aluminum	NA	477	52.6	388 J	192 E*	69.0
		Arsenic	NA	7.4	2.3	8.9 J	3.7	55.4
		Barium	NA	29.2 B	42	40.7 J	34.8	16.1
		Calcium	NA	166000	316000	324000	337000	28.1
		Iron	NA	582	618	2080	2460	68.1
		Magnesium	NA	32600	53600	52400	54300	21.7
		Manganese	NA	611	1560	1200 J	1590	36.7
		Potassium	NA	1350	4150	1666	1650	59.2
		Selenium	NA	1.5 N	0.68 U	2.4 J	2.4 B	47.4
		Sodium	NA	10400	17500	13200 J	13500	21.4
		Zinc	NA	5.5	3.8 B	14.2 J	9.1 B	56.4

Table 16
Comparability Results- Ground Water

Sample ID	Method	Compound	March 2000	May 2000	August 2000	September 2000	December 2000	% RSD
MW-107U	Metals	Aluminum	NA	51.6	112	165	67 E*	51.5
		Arsenic	NA	2.4 B	3.4	3	3.5	16.2
		Barium	NA	82	55	59.7	66.5	17.9
		Calcium	NA	104000	86000	92100	99100	8.3
		Chromium	NA	5.1	1.7 B	2.2	1.3 B	66.9
		Iron	NA	640	2560	2590	4590	62.2
		Magnesium	NA	12800	9960	11000	11100	10.5
		Manganese	NA	1290	3140	3170	3670 *	37.2
		Potassium	NA	15200	6900	7510	3560	59.3
		Sodium	NA	20000	20300	22700	31500 N	22.8
		Zinc	NA	5 U	7.5	5	11.8 B	43.8
MW-109U	Metals	Aluminum	NA	536	114	214 UJ*	185 E*	71.4
		Arsenic	NA	14	17.2	23	22.8	22.9
		Barium	NA	107	96.2	115 J	104	7.4
		Calcium	NA	80000	71200	82100	69000	8.5
		Iron	NA	12900	10100	12300	10100	12.9
		Magnesium	NA	11200	9630	11200	9490	9.1
		Manganese	NA	4240	3490	3880 J	4090	8.3
		Potassium	NA	2580	3780	2710	2560	20.1
		Sodium	NA	23500	19600	24300 J	22500	9.1
MW-110R	Metals	Aluminum	NA	660	847	814 E*	1370 E*	33.5
		Arsenic	NA	4.4	4.8	5.4	7.1	21.9
		Barium	NA	112	120	124	162	17.2
		Calcium	NA	63300	63500	69700	74300	7.8
		Copper	NA	7.4	18.8	8.9	28.3	61.3
		Iron	NA	1440	2410	2630	3400	32.7
		Magnesium	NA	16800	16100	18100	19100	7.6
		Manganese	NA	1480	1500	1770 *	1990	14.4
		Potassium	NA	3890	4780	2880	2550	28.7

Table 16
Comparability Results- Ground Water

Sample ID	Method	Compound	March 2000	May 2000	August 2000	September 2000	December 2000	% RSD
		Sodium	NA	60400	106000	129000 N	135000	31.5
		Zinc	NA	8.5	10	21.9	7.9 B	54.7
	VOC	Isopropylbenzene	NA	16	5.9	1.6 J	1	113.2+
		Methyl tert butyl ether	NA	1	1.4	1.4 J	3	52.2
MW-110U	Metals	Aluminum	NA	154	54.7	130 E*	25.7	66.7
		Arsenic	NA	0.76 B	1.3 B	2.4	2.6	49.9
		Barium	NA	48.4 B	116	114	134	36.4
		Calcium	NA	57400	110000	119000	140000	33.0
		Copper	NA	4.1 B	4.2 B	14.1	14	62.8
		Iron	NA	40.5	48.3	661	471	101.9
		Magnesium	NA	9350	19200	23000	28000	39.7
		Manganese	NA	346	1040	1500*	1080	50.2
		Potassium	NA	4900	25500	13600	13200	59.3
		Sodium	NA	47500	69400	276000 N	330000	79.2
	VOC	Isopropylbenzene	NA	1	0.96 J	1 U	1.1	5.9
		Xylene	NA	5	1.3	1	1.2	90.4
MW-111U	Metals	Aluminum	NA	18.6 B	107	196 UJ*	245 E*	70.6
		Barium	NA	43.3 B	39.5 B	57.2 J	42.7	17.2
		Calcium	NA	46400	42500	61100	51700	16.0
		Iron	NA	1570	913	1370	975	26.1
		Magnesium	NA	13600	11500	16900	14300	15.8
		Manganese	NA	671	368	510 UJ	369	30.0
		Potassium	NA	1300	1570	1330	1010	17.6
		Sodium	NA	36500	42100	61800 J	45800	23.3
MW-112U	Metals	Aluminum	NA	10.3 B	11.2 B	167 E*	193 E*	103.1+
		Calcium	NA	30000	24200	23200	19600	17.8
		Iron	NA	25 U	17 B	121	222	100.0+
		Magnesium	NA	8600	7190	7480	6030	14.4

Table 16
Comparability Results- Ground Water

Sample ID	Method	Compound	March 2000	May 2000	August 2000	September 2000	December 2000	% RSD
		Manganese	NA	6.1	1 B	0.28 U*	4.1	94.7
		Potassium	NA	551 B	519 B	660	459	15.4
		Sodium	NA	10100	4280	4700 N	2660	59.5
MW-113R	Metals	Aluminum	NA	NA	NA	54.4 E*	70.4	18.1*
		Arsenic	NA	NA	NA	58.4	54.2	5.3*
		Barium	NA	NA	NA	253	278	6.7*
		Calcium	NA	NA	NA	114000	112000	1.3*
		Copper	NA	NA	NA	1.7 B	4.9	68.6*
		Iron	NA	NA	NA	1190	1520	17.2*
		Lead	NA	NA	NA	0.23 B	8.1	133.6*,+
		Magnesium	NA	NA	NA	18600	17100	5.9*
		Manganese	NA	NA	NA	1310 *	2150	34.3*
		Potassium	NA	NA	NA	1520	1740	9.5*
		Sodium	NA	NA	NA	29000 N	28300	1.7*
		Zinc	NA	NA	NA	1.9 U	23.5 N	120.3*,+
MW-114U	Metals	Aluminum	NA	NA	NA	107 E*	327 E*	71.7*
		Arsenic	NA	NA	NA	2.4	3.4	24.4*
		Barium	NA	NA	NA	178	201	8.6*
		Calcium	NA	NA	NA	94900	136000	25.2*
		Chromium	NA	NA	NA	12.8	30	56.8*
		Copper	NA	NA	NA	3.1	4	17.9*
		Iron	NA	NA	NA	2420	6710	66.5*
		Magnesium	NA	NA	NA	14900	18700	16.0*
		Manganese	NA	NA	NA	9840 *	10700	5.9*
		Potassium	NA	NA	NA	4000	4100	1.7*
		Sodium	NA	NA	NA	85300 N	83300	1.7*
	VOC	1,2-Dichlorobenzene	NA	NA	NA	28 J	34	13.7*
		1,3-Dichlorobenzene	NA	NA	NA	0.69 J	1.1	32.4*
		1,4-Dichlorobenzene	NA	NA	NA	7.9 J	15	43.8*

Table 16
Comparability Results- Ground Water

Sample ID	Method	Compound	March 2000		May 2000	August 2000		September 2000		December 2000		% RSD
		Chlorobenzene	NA		NA	NA		36	J	66		41.6*
		Tetrachloroethylene	NA		NA	NA		78	J	6.3		120.3*,+
MW-B-7	Metals	Aluminum	21.7	J	NA	26.3	B	17.2	UJ*	38.8		35.8
		Barium	17.5		NA	21.7	B	23.7	J	20.9		12.3
		Calcium	54100		NA	53300		62700		62400		8.8
		Iron	25.4	J	NA	42.2		273	U	238		89.2
		Magnesium	14600		NA	13900		16500		16600		8.8
		Manganese	4.9	J	NA	5.9		15.1	UJ	2.4		78.4
		Potassium	361		NA	523	B	411		270		27.0
		Sodium	3740		NA	4080		3010	J	2060		27.8
MW-L-10	Metals	Aluminum	196		NA	69.9		104	UJ*	55.4		59.4
		Arsenic	0.71	J	NA	0.77	B	2.2	U	1.7		54.1
		Barium	60.9		NA	50.6		54.3	J	76.2		18.7
		Calcium	146000		NA	127000		128000		123000		7.8
		Iron	958	J	NA	1090		2190		2840		51.0
		Magnesium	38600		NA	29900		26500		24300		21.1
		Manganese	595	J	NA	1680		2880	J	2780		54.1
		Potassium	454		NA	1500		787		1020		46.7
		Sodium	80800		NA	34400		31800	J	23700		60.5
MW-L-11	Metals	Aluminum	12.3	J	NA	11.4	B	96.8	UJ*	121		94.2
		Barium	48		NA	28.2	B	41.7	J	42.7		21.0
		Calcium	60500		NA	36900		53800		55300		19.8
		Magnesium	11900		NA	7110		10300		10800		20.5
		Manganese	1	J	NA	5.1		6.2	UJ	6.4		53.8
		Potassium	2940		NA	3070		3050		2770		4.6
		Sodium	25200		NA	10500		17400	J	18000		33.8
MW-L-3	Metals	Aluminum	12.6	J	NA	9.1	B	99.4	UJ*	31.5	E*	110.1+
		Arsenic	9.4		NA	11.8		17.8		17.4		29.5
		Barium	113		NA	77.9		101	J	104		15.1

Table 16
Comparability Results- Ground Water

Sample ID	Method	Compound	March 2000		May 2000	August 2000		September 2000		December 2000		% RSD
		Calcium	112000		NA	73400		92900		90200		17.2
		Iron	8130	J	NA	6250		8440		7010		13.6
		Magnesium	12700		NA	7780		9150		8680		22.5
		Manganese	9770	J	NA	6950		6950	J	7490		17.3
		Potassium	2460		NA	3600		2860		2690		17.0
		Sodium	29600		NA	19000		23900	J	25600		17.9
		Zinc	9.1		NA	10.8		5.4	U	3.3	B	47.8
	VOC	1,2-Dichlorobenzene	0.8	J	NA	1.5		1.7	J	1.2		30.1
MW-L-4	Metals	Aluminum	76.5	J	NA	55.4		421	J*	77.9		111.5+
		Barium	35.7		NA	23.6	B	29.1	J	34.3		17.9
		Calcium	78600		NA	53200		65400		66900		15.7
		Iron	138	J	NA	96.8		294	U	312		51.7
		Magnesium	15200		NA	9210		11700		12000		20.4
		Manganese	7.4	J	NA	6.7		62.2	UJ	4.7		138.2+
		Potassium	3720		NA	4800		3700		3480		15.1
		Sodium	30000		NA	17800		21500	J	20600		23.4
		Zinc	66.4		NA	5.7		21.4		1.9	UN	124.1+
MW-L-5	Metals	Aluminum	175	J	NA	22.5	B	119	UJ*	735	E*	122.1+
		Barium	31.2		NA	29.4	B	38.2	J	53.6		28.9
		Calcium	50700		NA	68700		85200		88600		23.7
		Copper	1.2	J	NA	0.41	B	2	U	3.4		72.8
		Iron	283	J	NA	34.5		391	U	1760		125.8+
		Lead	1	U	NA	0.68		9.2	J	0.98	B	140.3+
		Magnesium	9890		NA	15100		19700		21800		31.8
		Manganese	19.7	J	NA	3.1		27.3	UJ	73		97.2
		Potassium	2800		NA	4210		3350		4040		18.1
		Selenium	2.3	J	NA	1.4	N	2	J	4.4		51.7
		Sodium	69200		NA	28300		45100	J	41900		36.9
MW-L-6	Metals	Aluminum	9.4	J	NA	28.4	B	62.4	UJ*	18.3	E*	78.3

Table 16
Comparability Results- Ground Water

Sample ID	Method	Compound	March 2000		May 2000	August 2000		September 2000		December 2000		% RSD
		Barium	14.2		NA	13.5	B	19.2	J	20		20.0
		Calcium	41500		NA	41100		54200		52300		14.7
		Iron	25	U	NA	53.6		273	U	229		85.5
		Magnesium	7030		NA	6870		9280		8430		14.6
		Manganese	6.2	J	NA	7.2		23.3	UJ	4.8		83.6
		Potassium	1150		NA	1840		1720		1570		19.2
		Sodium	19400		NA	13500		17100	J	16300		14.7
MW-L-7	Metals	Aluminum	99.5	J	NA	519		886	E*	224		81.0
		Arsenic	0.86	J	NA	0.56	B	0.85	B	0.74		18.5
		Barium	23		NA	31.9	B	47.8		40.4		29.9
		Calcium	38900		NA	49300		66000		78600		30.2
		Copper	1.2	J	NA	3.2	B	4.2		3.8		43.0
		Iron	174	J	NA	847		1190		548		62.7
		Lead	1	U	NA	1.3		3.1		2.7		50.9
		Magnesium	6310		NA	7830		13300		17100		44.7
		Manganese	11	J	NA	89.2		33	*	24.4		87.3
		Potassium	4190		NA	7530		5490		3750		32.4
		Selenium	3.8	J	NA	0.9	B	3.5		4.4		49.1
		Sodium	94500		NA	51100		72200	N	69800		24.7
		Zinc	33.6		NA	6		9.9	B	1.9	UN	110.6[+]
MW-L-9	Metals	Aluminum	505	J	NA	344		168	E*	153	E*	56.8
		Barium	11.5		NA	13	B	21.4		24.6		36.2
		Calcium	36200		NA	43200		50400		55100		17.9
		Cyanide	5	U	NA	4.6		2.2	B	2	B	45.5
		Iron	985	J		665		460		409		41.5
		Lead	1	U	NA	0.78		6.5		3.3		91.9
		Magnesium	5350		NA	7170		8480		9210		22.4
		Manganese	47.3	J	NA	33.1		48.3	*	112		58.6
		Potassium	827		NA	0.88	B	1240		1330		71.4

Table 16
Comparability Results- Ground Water

Sample ID	Method	Compound	March 2000	May 2000	August 2000	September 2000	December 2000	% RSD
		Sodium	9380	NA	0.2 U	16100 N	16800	73.8
		Zinc	72.2	NA	11600	3.2 B	17.5 B	197.9+

* Only two rounds of data exist for these wells. Therefore, the reported value is RPD.
+ % RSD or RPD exceeds acceptance criteria.

Table 17
Comparability Results- Residential Wells

Sample ID	Method	Compound	May 2000		Aug 2000		RPD
RW-001	Metals	Barium	36.7	J	40		8.6
		Calcium	94200	J	99800		5.8
		Copper	42.6	J	64.6		41.0
		Iron	63.3	J	66.7		5.2
		Magnesium	8370		9430		11.9
		Manganese	2.6	J	4.4		51.4
		Potassium	3590	J	4990		32.6
		Sodium	67700	J	56300		18.4
		Zinc	6	J	6.5		8.0
RW-002	Metals	Aluminum	562	J	6.6	B	195.4*
		Barium	33	J	43.3		27.0
		Calcium	35900	J	44700		21.8
		Copper	21.4	J	29.3		31.2
		Iron	1040	J	16.6	B	193.7*
		Lead	1.5		0.93		46.9
		Magnesium	13300		15900		17.8
		Manganese	147	J	18.3		155.7*
		Potassium	1510	J	2840		61.1
		Sodium	17200	J	23800		32.2
		Zinc	17.8		22.3		22.4
RW-003	Metals	Antimony	2	J	0.64	B	103.0*
		Arsenic	5	J	4.7		6.2
		Barium	28.9		30.1	B	4.1
		Calcium	27600	J	26400		4.4
		Copper	3.5	J	1.2	B	97.9
		Iron	170	J	198		15.2
		Magnesium	9510		9370		1.5
		Manganese	189	J	230		19.6
		Potassium	519	J	946	B	58.3
		Sodium	2620	J	2940		11.5
RW-004	Metals	Barium	111		85.4		26.1
		Calcium	43500	J	34800		22.2
		Copper	2.4	J	1.7	B	34.1
		Iron	1410	J	753		60.7
		Lead	0.68	J	0.28	B	83.3
		Magnesium	11600		9450		20.4
		Manganese	177	J	217		20.3
		Potassium	603	J	470	B	24.8
		Sodium	6710	J	5370		22.2

Table 17
Comparability Results- Residential Wells

Sample ID	Method	Compound	May 2000		Aug 2000		RPD
		Zinc	11.4		13.6		17.6
		Zinc	9	J	6.6		30.8
RW-005	Metals	Antimony	1.4	J	0.6	B	80.0
		Barium	13.8		22	B	45.8
		Calcium	30200	J	40800		29.9
		Copper	24.5	J	65.5		91.1
		Lead	0.66	J	0.97		38.0
		Magnesium	4960		6330		24.3
		Manganese	0.5	J	2.3	B	128.6*
		Potassium	2310	J	4480		63.9
		Sodium	16300	J	12600		25.6
		Zinc	6.9	J	13.7		66.0
RW-006	Metals	Antimony	1.4	J	1	B	33.3
		Barium	25.3		34.7	B	31.3
		Calcium	41200	J	4880		157.6*
		Copper	45.4	J	53		15.4
		Lead	1.7		2		16.2
		Magnesium	7360		8710		16.8
		Manganese	0.92	J	20.3		182.7*
		Potassium	3650	J	9090		85.4
		Selenium	0.75	J	1	*N	28.6
		Sodium	18200	J	38700		72.1
		Zinc	25.2		26.2		3.9
	VOC	Methyl tert-butyl ether	1	U	4.4		125.9*
RW-007	Metals	Antimony	1.9	J	0.48	B	119.3*
		Barium	182		136		28.9
		Calcium	72600	J	58100		22.2
		Copper	20.6	J	18.5		10.7
		Magnesium	9290		7340		23.5
		Manganese	47.4		34.9		30.4
		Potassium	589	J	596	B	1.2
		Sodium	3370	J	2800		18.5
		Zinc	8.8	J	12.4		34.0
RW-008	Metals	Barium	83.8		127		41.0
		Calcium	45300	J	57100		23.0
		Copper	3.2	J	16.5		135.0*
		Iron	110	J	22.5		132.1*
		Lead	0.99	J	0.92		7.3
		Magnesium	12000		15000		22.2
		Manganese	167	J	503		100.3*

Table 17
Comparability Results- Residential Wells

Sample ID	Method	Compound	May 2000		Aug 2000		RPD
		Potassium	643	J	1210		61.2
		Sodium	19400	J	39900		69.1
	VOC	Tetrachloroethylene	1	J	1	U	0.0
RW-009	Metals	Antimony	1.5	J	0.51	B	98.5
		Barium	10		9.2	B	8.3
		Calcium	42900	J	40700		5.3
		Copper	15.3	J	18.8		20.5
		Lead	0.66	J	1.3		65.3
		Magnesium	7520		7020		6.9
		Manganese	0.71	J	0.22	B	105.4*
		Potassium	923	J	1510		48.3
		Sodium	11600	J	11200		3.5
		Zinc	12.5		11.5		8.3
	SVOC	Hexachloroethane	1	J	2	U	66.7
RW-010	Metals	Arsenic	6.4	J	1.6	B	120.0*
		Barium	7.8	J	7.8	B	0.0
		Calcium	168000	J	215000		24.5
		Copper	17.9	J	4.9	B	114.0*
		Iron	1890	J	709	*N	90.9
		Lead	493	J	4		196.8*
		Magnesium	14600		15100		3.4
		Manganese	690	J	664		3.8
		Potassium	3080	J	4870		45.0
		Sodium	83400	J	177000		71.9
		Zinc	10	J	10		0.0

FIGURES